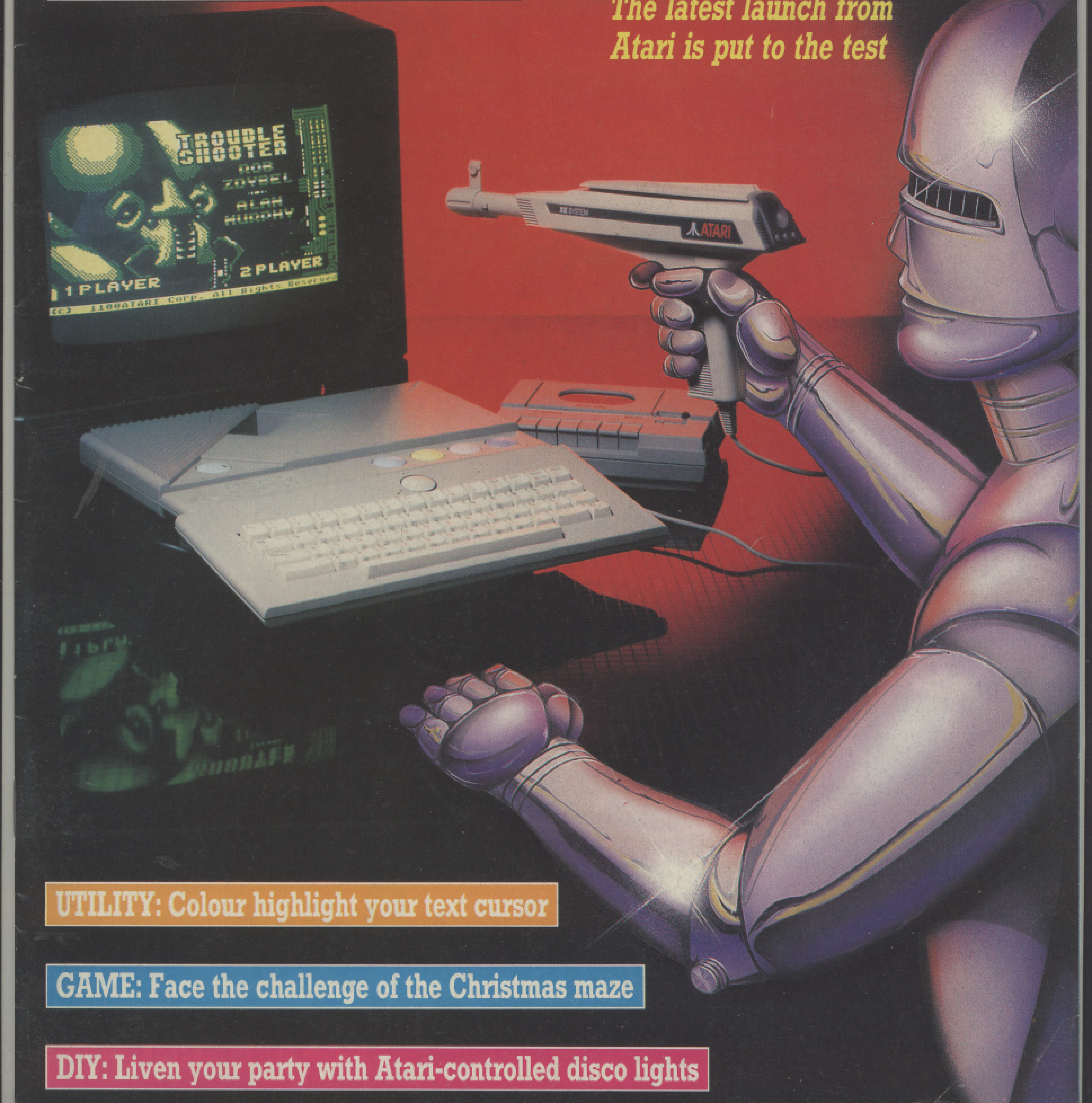
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ATARI USER

Vol. 3 Vol. 8 December 1987 £1.25

RIGHT ON TARGET?

The latest launch from Atari is put to the test



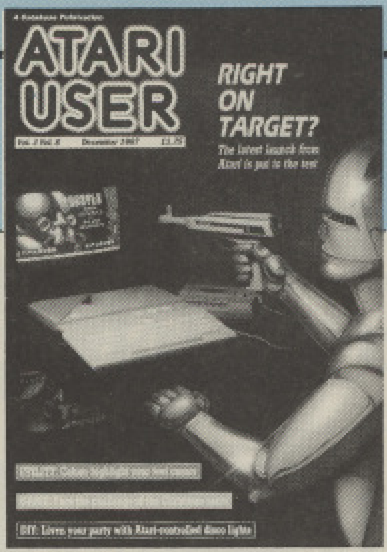
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Atari in top gear at Motor Fair

ATARI UK caused a big stir at the MotorFair in Olympia by setting up a computer games stand.

Centrepiece of the stand, which embarrassed show organisers admitted was the best visited in the whole exhibition, was a line of racing cars inside which youngsters could play Pole Position.

An Atari spokesman said: "We believe that many of the 300,000 people who go to the show are fathers with children under 10. We saw this as a perfect opportunity to introduce our games system to these youngsters, many of whom might never have seen them before.

"The organisers said we had one of the most exciting exhibits. It became virtually an entertainment area for the youngsters.

"We believe the introduction of the new games machine this Christmas has opened up a new market place to us. The youngsters of that market place certainly responded enthusiastically at this show", said the spokesman.

£1.3 million deal brings big Email expansion

A MASSIVE expansion of MicroLink, Britain's fastest-growing electronic mail service, is now being planned following the completion of a £1.3 million contract with Telecom Gold.

MicroLink – which has a section specifically for Atari users – was launched in April 1985 as a means of encouraging people to start exploring the exciting new world of electronic communications.

It became an instant success – and not only in Britain. Computer users in Europe, the Middle East and Australasia call the MicroLink service, which is housed on a Prime 750 computer in Telecom Gold's top security London head-

As part of the new deal, the service is being transferred to a machine that is four times more powerful – the Prime 9955.

"The phenomenal development of MicroLink has meant that we have now outgrown the computer that has served us so well in the last two and half years", said MicroLink chairman Derek Meakin.

"The new machine will give us much greater flexibility. It will allow us to provide a much faster service, introduce a variable charging structure to meet the different needs of our users, and make possible the installation of many new and exciting facilities".



Pictured after signing the £1.3 million deal are Telecom Gold general manager Clem Jones (seated left) and head of MicroLink Derek Meakin. Looking on, from left, are MicroLink sales and marketing manager Mike Hayes, Telecom Gold sales and marketing head Philip Madden, MicroLink joint managing director Michael Meakin, MicroLink marketing director Peter Brameld, Telecom Gold northern sales manager David Bromley and MicroLink systems manager Tim Clarkson.

Software developers rapped

ATARI 8 bit micro users are being given a raw deal by some software developers according to Essex-based retailer Clive Pulman.

His firm, Trybridge, has sold computer software for more than four years and Pulman says he has had particular difficulty getting a regular supply of new titles for Atari 8 bit machines.

"The amount of new programs coming available is pathetic", said Pulman. "The machines have so much potential it is a pity that software houses are not picking up on them the way they should".

Pulman says that although Americans have about 2,000 Atari 8 bit programs to choose from, Britain is limited to "a few hundred – of which many are re-issues of old titles that don't fully utilise the machines' capabilities".

One major software house was quick to deny the situation is as grim as Pulman describes it. US Gold marketing and product manager Richard Tidsall told *Atari User:* "Currently we have 65 games available on licence from America, which isn't bad for just one publisher.

"American buyers may have a greater choice, but what is suitable for them may not be suitable for us".

But there is good news for users – Atari UK is back in the software market itself with Twilight Zone and has another 20 rom cartridge games due for release.

Parallel interface for Ataris

A LEADING supplier is aiming to make Atari 8 bit users fall in love with its new internal add on.

The Computer House Universal Parallel Interface Device, or Cupid, will cost £39.95 and could open up the 8 bit machine to the world.

A series of handlers will be produced by Computer House (01-731 1276) to enable the interface to work with modems, printers and Midi, using a standard 25-way D socket. With a rom support system, the interface will be fully programmable.

Cupid is just one of a number of products on the cards as Computer House steps up its support for the 8 bit range.

A Help menu will be on offer which allows the user to put all the instructions about a program in a form which can be pulled up by a single keystroke.

CH boss John May said the company was importing a growing selection of software from the US.

A 130XE high resolution designer is on the cards which will work very well with CH's Snapshot.

Also to be released is Word Magic, which John May describes as a word processor with built-in graphics. It will cost £17.99.

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ATARI

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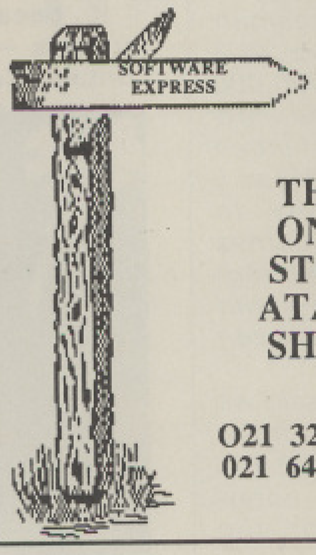
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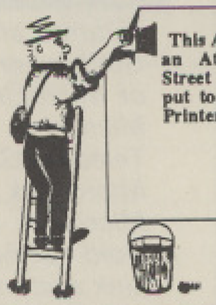
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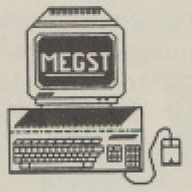
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Be a back seat driver

BACK seat driving takes on a new dimension in Speed Run, one of a series of Christmas releases from Red Rat.

Unlike most racing games, the player's point of view is behind an animated driver who turns corners and changes gear on command.

Red Rat (061-835 1055) says it is the most ambitious motor driving game ever written for an 8 bit machine.

The object is to complete the various stages of a motor rally in a Ford Sierra RS Cosworth with its five-speed gearbox.

The company also has two double packs ready for release.

In the first, Planet Attack is paired with Mad Jax.

The former is a multi-speed, 3D scrolling shoot 'em up in which the player must guide a craft on a mission to destroy a series of outposts guarded by vicious aliens.

Mad Jax gives a bird's eye view of an armoured tank which must negotiate a desert road and a city, taking on all opponents along the way.

The second double pack features platform adventures Burglar Bill and Pothole Panic.

All Red Rat pre-Christmas releases are being sold at £7.95 on cassette and £9.95 on disc.

Colour-coded discs

A RANGE of 5.25in coloured discs for Atari computers has been announced by Centec.

The discs, which come in five colours, have been produced as a result of customer demand for an easier way to identify their data discs from program or back-up discs.

John Taylor, managing director of Centec (0689 35353), told Atari User: "Single colour discs have been causing problems for our customers. Now that they have a choice of colours it is possible for them to store data on red discs, back-up discs on green and program discs on blue.

"With the addition of yellow and black it gives the customer greater flexibility in storage identification".

DTP PACKAGE

A £20 desktop publishing package for Atari 8 bit machines is scheduled for release in the new year.

US software house XLent – now half-owned by Software Express (021-328 3585) – has put together on disc Typesetter and Rubber Stamp.

Typesetter helps with page layout, while Rubber Stamp is essentially a font designer.

The Gallup Chart TOP 20

ATARI SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	1	**DECATHLON** *Firebird*	1.99
2	6	**FEUD** *Mastertronic*	1.99
3	2	**180** *Mastertronic*	2.99
4	16	**DIZZY DICE** *Players*	1.99
5	8	**GAUNTLET** *US Gold*	9.95
6	●	**MONKEY MAGIC** *Alternative*	1.99
7	3	**MILK RACE** *Mastertronic*	2.99
8	5	**ON CUE** *Mastertronic*	2.99
9	●	**HOVVER BOVVER** *Mastertronic*	1.99
10	15	**LEADERBOARD** *US Gold*	9.95
11	4	**STORM** *Bulldog*	1.99
12	9	**SILENT SERVICE** *Microprose/US Gold*	9.95
13	●	**DRUID** *Firebird*	9.95
14	●	**RED MAX** *Code Masters*	1.99
15	14	**BOULDER DASH II** *First Star/Prism*	2.99
16	●	**INVASION** *Mastertronic*	1.99
17	●	**FOUR GREAT GAMES** *Micro Value*	3.99
18	●	**FOOTBALL MANAGER** *Addictive*	1.99
19	7	**LIVING DAYLIGHTS** *Domark*	9.95
20	●	**FOUR GREAT GAMES 2** *Micro Value*	3.99

Compiled by Gallup/Microscope

Decathlon retains the first position for another month, but there are eight new and re-entries in the chart. The highest entry is the new Monkey Magic from Alternative. Watch out for Micro Value's two compilations which also enter the chart in time for Christmas.

Lost in your listings?

Colour your cursor with this superb utility from David Steele

HOW many times have you been editing a program on screen, then looked away for a minute, looked back and couldn't find the cursor? Well here's a program that tracks the normal cursor with a coloured player missile.

It will help you find it in a screen full of text or you could even use the cursor to indicate an INPUT from the keyboard by changing its colour after each entry.

The new cursor shows up particularly well in reverse video strings, where it is often easily lost during editing. It's visible on any Graphics 0 screen in Basic, Dos or Assembler, and will also appear in the text window. It will remain even if you press Break or System Reset.

There are two versions of the program: Program I creates an AUTORUN.SYS file on any Dos disc, while Program II creates an AUTOBOOT cassette. Type in the program you need and use the Get it Right II! checksum to correct any typing errors.

If you use disc save your program as a master, then Run it. It will proceed to create a .SYS file to disc which will boot into memory on power-up.

Tape users should save a copy of the program as a master, put a cassette in the recorder, rewind it and press Record and Play together. Run the program and, when you hear two beeps, press Return to save your autoboot version to tape. When the program ends, switch the computer off and rewind the cassette.

Getting the coloured cursor is now just like booting a game: Press Play, hold down Start and switch on. When you hear the beep, press Return, and after about 15 seconds the coloured cursor will appear. Remember to stop the cassette.

The cursor colour is initially set to orange/red, but you can alter this in either program by changing the 240 – line 1050 of Program I, line 1040 of Program II – to any number from 1 to 255. Some of the colours available are given in the panel below If you want to change the cursor colour once the program is loaded it is controlled by poking 705 with an even number from 0 to 254. For even better effects, try altering the text colours by poking 709 and 710.

If you wish to use player-missile graphics in your program, switch off the coloured cursor and when you have finished with them enter POKE 54279,4:POKE 53277,3 before switching them back on.

The coloured cursor boots from disc or cassette into page 6 and the program itself occupies the lower half of of this area of memory. The upper half is used as player 1 in double-line resolution mode. For machine code enthusiasts, Program III is the assembler source listing of the disc version. Program IV shows the changes necessary for cassette booting.

The program is protected against the Reset button and the Break key meaning that once installed the only way to totally disable it is to turn the power off. If at any time you lose the colour of the cursor press Reset to bring it back.

The cursor can be affected be poking directly into the code that controls it. Some useful ones are given in panel above.

POKE	COLOUR
710,1	Black
710,54	Pink
710,64	Purple
710,94	White
710,164	Green
710,242	Red/Brown

Pokes to give different colour to the cursor

Listing I: Program to create AUTORUN.S YS disc file.

```
10 REM COLOURED CURSOR
11 REM BY GLOBAL COMPUTER SERVICES
12 REM (c)ATARI USER
13 REM DISC AUTOBOOT
20 GRAPHICS 0:POSITION 9,11
30 ? "Setting up AUTORUN.SYS"
40 OPEN #1,8,0,"D:AUTORUN.SYS"
50 RESTORE 1000
60 READ D:IF D<0 THEN 80
70 PUT #1,D:GOTO 60
80 CLOSE #1
90 POSITION 15,13:? " ALL DONE ":END
100 REM ----------------------------
1000 DATA 255,255,0,6,127,6,165
1010 DATA 12,141,22,6,165,13,141
1020 DATA 23,6,169,21,133,12,169
1030 DATA 6,133,13,76,24,6,32
1040 DATA 0,0,169,4,141,7,212
1050 DATA 169,3,141,29,208,169,240
1060 DATA 141,193,2,173,36,2,141
1070 DATA 126,6,173,37,2,141,127
1080 DATA 6,169,7,162,6,160,60
1090 DATA 76,92,228,216,169,0,168
1100 DATA 153,128,6,200,16,250,173
1110 DATA 240,2,208,50,169,46,141
1120 DATA 47,2,169,4,205,191,2
1130 DATA 240,6,166,87,208,34,240
1140 DATA 6,169,24,166,123,240,26
1150 DATA 24,101,84,10,10,168,162
1160 DATA 3,169,60,153,131,6,136
1170 DATA 202,16,249,165,85,10,10
1180 DATA 105,46,141,1,208,76,0
1190 DATA 0,224,2,225,2,0,6,-1
2000 REM ------------------------------
2010 REM The '240' in line 1050 is
2020 REM the initial cursor colour
```

Get it right! II

10 CP1 (Y)	100 CUS (1)	1110 GU5 (X)
11 CT1 (O)	1000 EE8 (L)	1120 GVD (T)
12 CX1 (X)	1010 EY3 (S)	1130 HHU (K)
13 D21 (O)	1020 FQN (M)	1140 G9A (S)
20 RUK (6)	1030 FQQ (3)	1150 GJ8 (8)
30 DOG (4)	1040 DPA (Y)	1160 FEW (Q)
40 RF7 (2)	1050 P1Y (2)	1170 HK2 (7)
50 TCW (H)	1060 FJH (V)	1180 GW2 (W)
60 FWK (N)	1070 GW5 (5)	1190 ENO (A)
70 4AM (F)	1080 FWK (6)	2000 CXP (G)
80 LV6 (A)	1090 HY9 (K)	2010 DOP (A)
90 8H1 (G)	1100 N2H (O)	2020 D2P (G)

POKE	ACTION
752,1	Cursor off
752,0	Cursor on
53277,0	Remove colour
53277,3	Restore colour

Pokes that affect the cursor

PROGRAM BREAKDOWN

20-50	Set up screen and open file
60-70	Copy program data to file
80-90	Close file, report all done

MACHINE CODE

470-690	Install coloured cursor into the disc or cassette init vector. This protects against Reset
730-930	Define the player-missile area and turn it on. The cursor colour is set here, but it can be changed at any time. The position of the player is set during Vblank, so that routine is installed
970-1060	Erase the cursor from its current position
1080-1090	Check whether the coloured cursor is required
1110-1120	Force the player-missile to appear, and also set double-resolution mode. This is done in every Vblank because a change of graphics mode will alter SDMCTL without warning
1170-1300	Test to see if a GR.0 screen, GR.0 text window or if no GR.0 screen showing at all. Also decide the vertical position of the player-missile
1360-1560	Draw the cursor into the player, and position it horizontally. The final exit is to any other Vblank code that may have been installed

Listing II: Program to create AUTOBOOT cassette file.

```
10 REM COLOURED CURSOR
11 REM BY GLOBAL COMPUTER SERVICES
12 REM (c)ATARI USER
13 REM CASSETTE AUTOBOOT
20 GRAPHICS 0:POSITION 9,11
30 ? "Setting up CASSETTE BOOT"
40 OPEN #1,8,128,"C:"
50 RESTORE 1000
60 READ D:IF D<0 THEN 80
70 PUT #1,D:GOTO 60
80 CLOSE #1
90 POSITION 15,13:? " ALL DONE ":END
100 REM ----------------------------
1000 DATA 0
1010 DATA 1,0,6,13,6,169,60
1020 DATA 141,2,211,24,96,169,4
1030 DATA 141,7,212,169,3,141,29
1040 DATA 208,169,240,141,193,2,173
1050 DATA 36,2,141,115,6,173,37
1060 DATA 2,141,116,6,169,7,162
1070 DATA 6,160,49,76,92,228,216
1080 DATA 169,0,168,153,128,6,200
1090 DATA 16,250,173,240,2,208,50
1100 DATA 169,46,141,47,2,169,4
1110 DATA 205,191,2,240,6,166,87
1120 DATA 208,34,240,6,169,24,166
1130 DATA 123,240,26,24,101,84,10
1140 DATA 10,168,162,3,169,60,153
1150 DATA 131,6,136,202,16,249,165
1160 DATA 85,10,10,105,46,141,1
1170 DATA 208,76,-1
2000 REM ----------------------------
2010 REM The '240' in line 1040 is
2020 REM the initial cursor colour
```

Get it right! II

10 CP1 (Y)	100 CUS (P)	
11 CT1 (O)	1000 L1X (5)	
12 CX1 (X)	1010 CYW (F)	1110 ENJ (P)
13 D21 (O)	1020 F2R (K)	1120 GUV (1)
20 RUK (6)	1030 F5E (C)	1130 F7S (J)
30 4HX (2)	1040 R25 (P)	1140 GVU (8)
40 3J3 (N)	1050 G08 (V)	1150 PGH (G)
50 TCW (7)	1060 FJD (3)	1160 FCS (O)
60 FWK (2)	1070 HDX (E)	1170 YHK (H)
70 4AM (S)	1080 HMV (6)	2000 CXP (N)
80 LV6 (W)	1090 GF4 (T)	2010 DOP (H)
90 8H1 (R)	1100 FJV (N)	2020 D2P (N)

Listing III: MAC65 Source code.

```
10 ;LIST#D: SOURCE LISTING
20 ;
30 ;  Coloured cursor for XL/XE
40 ;        DISK VERSION
50 ;
60 ;  By David Steele
70 ;  (c)ATARI USER
80 ;
90 ;
0100 ; This program will create an
0110 ; AUTORUN.SYS file on a Dos
0120 ; format disc.
0130 ;
0140 ;
0150 ;
0160      .OPT NO LIST
0170 ;
0180 ; BEGIN
0190 ;
0200 ; <This is a MAC65 source file>
0210 ;
0220 DOSINI = $0C
0230 ROWCRS = $54
0240 COLCRS = $55
0250 DINDEX = $57
0260 SWPFLG = $7B
0270 ;
0280 VVBLKD = $0224
0290 SDMCTL = $022F
0300 BOTSCR = $02BF
0310 PCOLR1 = $02C1
0320 RUNADR = $02E0
0330 CRSINH = $02F0
0340 ;
0350 HPOSP1 = $D001
0360 GRACTL = $D01D
0370 PMBASE = $D407
0380 ;
0390 SETVBV = $E45C
0400 ;
0410 ;------------------------------
0420 ;
0430 PLAYER = $0680
0440 ;
0450      *=  $0600
0460 ;
0470 ;Program runs here when loaded
0480 ;
0490 START
0500 ;
0510 ;Intercept DOS init vector to
0520 ;re-enable cursor after Reset
```

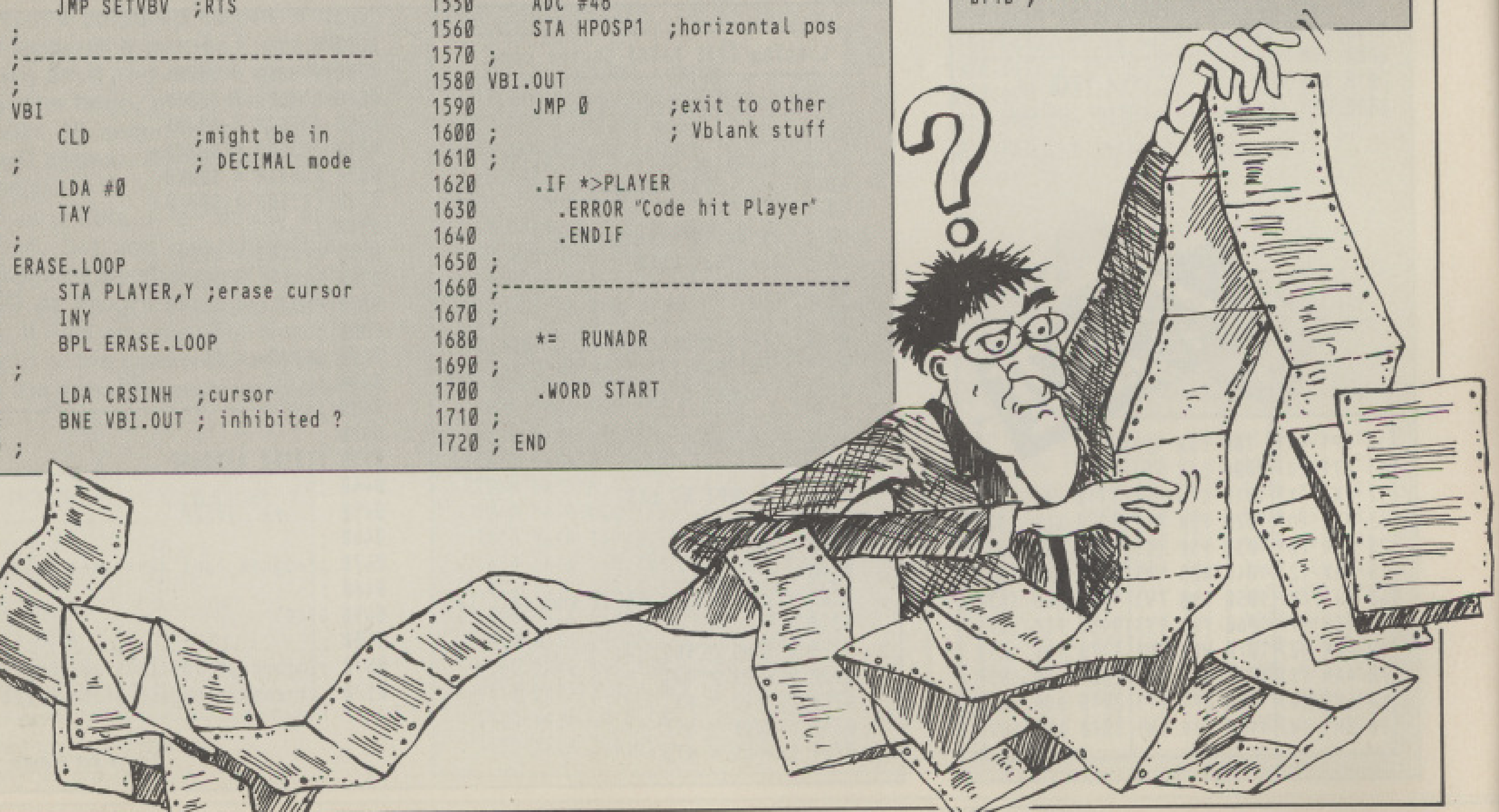
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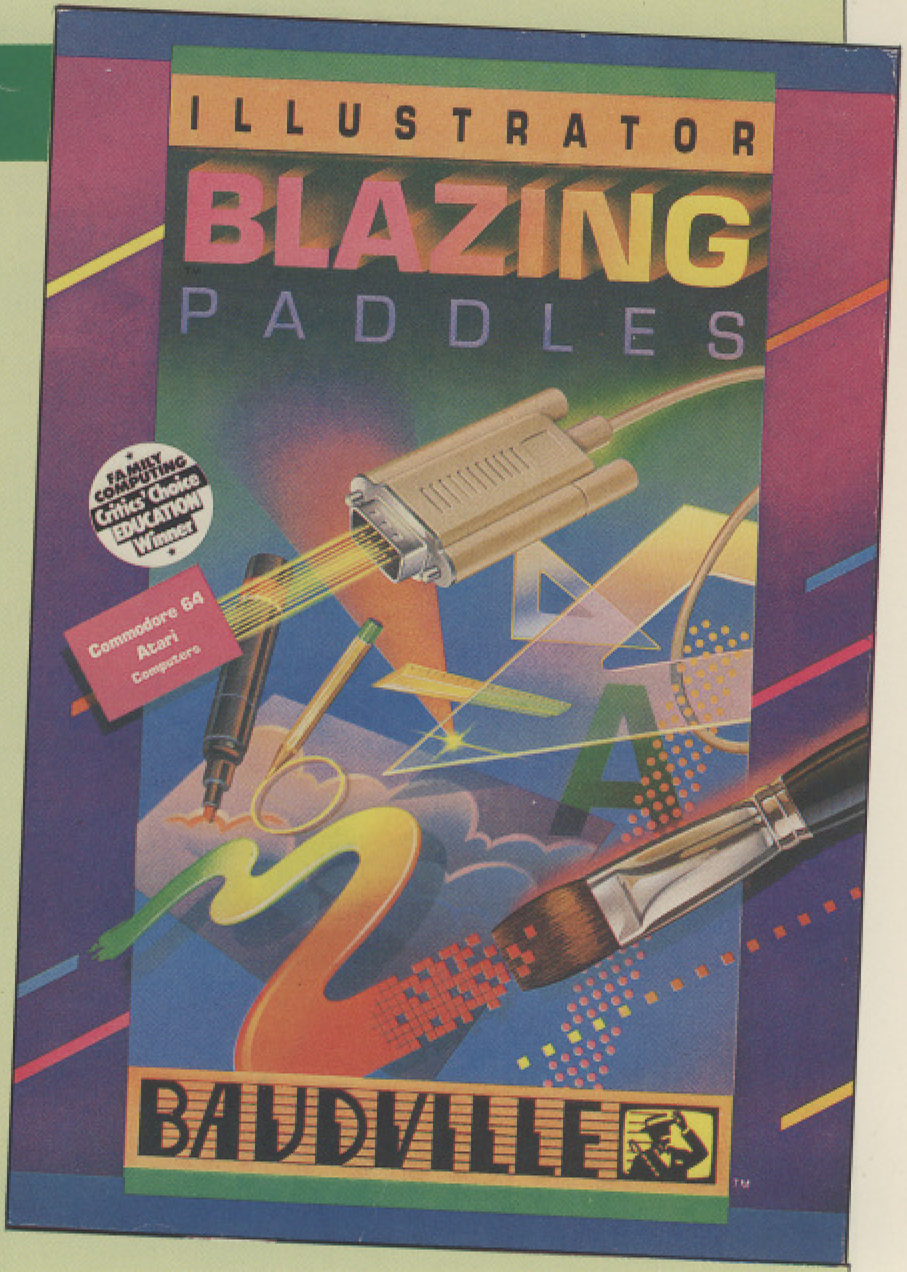
```
0530 ;
0540      LDA DOSINI+0
0550      STA RESET+1
0560      LDA DOSINI+1
0570      STA RESET+2
0580 ;
0590      LDA # <RESET
0600      STA DOSINI+0
0610      LDA # >RESET
0620      STA DOSINI+1
0630 ;
0640      JMP INIT
0650 ;
0660 ;Comes here after Reset
0670 ;
0680 RESET
0690      JSR 0        ;  old DOSINI
0700 ;
0710 ;-------------------------------
0720 ;
0730 INIT
0740      LDA #4
0750      STA PMBASE  ;player area is
0760 ;                ;pages 4..7
0770      LDA #3
0780      STA GRACTL  ;show player
0790 ;
0800      LDA #$F0
0810      STA PCOLR1  ;cursor colour
0820 ;
0830 ;Player cursor will follow real
0840 ;cursor during deferred Vblank
0850 ;
0860      LDA VVBLKD+0 ;keep existing
0870      STA VBI.OUT+1 ;Vblank stuff
0880      LDA VVBLKD+1
0890      STA VBI.OUT+2
0900      LDA #7
0910      LDX # >VBI  ;install ours
0920      LDY # <VBI
0930      JMP SETVBV  ;RTS
0940 ;
0950 ;-------------------------------
0960 ;
0970 VBI
0980      CLD          ;might be in
0990 ;                 ; DECIMAL mode
1000      LDA #0
1010      TAY
1020 ;
1030 ERASE.LOOP
1040      STA PLAYER,Y ;erase cursor
1050      INY
1060      BPL ERASE.LOOP
1070 ;
1080      LDA CRSINH  ;cursor
1090      BNE VBI.OUT ; inhibited ?
1100 ;
1110      LDA #$2E    ;enable players
1120      STA SDMCTL  ; in single res
1130 ;
1140 ;(any GR. alters SDMCTL so it
1150 ; is constantly restored here)
1160 ;
1170      LDA #4
1180      CMP BOTSCR  ;4/24
1190      BEQ WINDOW  ;text window ?
1200 ;
1210      LDX DINDEX  ;full screen but
1220      BNE VBI.OUT ; not GR.0 ?
1230 ;
1240      BEQ DRAW    ;always branch
1250 ;
1260 WINDOW
1270      LDA #24
1280 ;
1290      LDX SWPFLG  ;cursor in main
1300      BEQ VBI.OUT ; GR. screen ?
1310 ;
1320 ;Cursor is in:
1330 ; main GR.0 screen (A= 4)
1340 ; text window      (A=24)
1350 ;
1360 DRAW
1370      CLC
1380      ADC ROWCRS
1390      ASL A
1400      ASL A
1410      TAY          ;vertical pos
1420 ;
1430      LDX #3
1440      LDA #$3C    ;cursor data
1450 ;
1460 DRAW.LOOP
1470      STA PLAYER+3,Y
1480      DEY
1490      DEX
1500      BPL DRAW.LOOP
1510 ;
1520      LDA COLCRS
1530      ASL A
1540      ASL A        ;(CLC)
1550      ADC #46
1560      STA HPOSP1  ;horizontal pos
1570 ;
1580 VBI.OUT
1590      JMP 0        ;exit to other
1600 ;                 ; Vblank stuff
1610 ;
1620      .IF *>PLAYER
1630        .ERROR "Code hit Player"
1640        .ENDIF
1650 ;
1660 ;-------------------------------
1670 ;
1680      *=  RUNADR
1690 ;
1700      .WORD START
1710 ;
1720 ; END
```

Listing IV: Modifications to Listing III to create a cassette AUTOBOOT file.

```
10 ;LIST#D:PROGRAM3.LST
20 ;
30 ;  Coloured cursor for XL/XE
40 ;      CASSETTE VERSION
50 ;
51 ;*THESE PROGRAM LINES REPLACE THE*
52 ;*CORRESPONDING LINES IN PROGRAM2*
53 ;
0320 PACTL = $D302
0410 ;----------------------------
0420 ;
0430 PLAYER = $0680
0440 ;
0450      *=  $0600
0460 ;
0470 LOAD
0480 ;
0490 ;Header data for cassette boot
0500 ;
0510      .BYTE 0      ;unused
0520      .BYTE 1      ;# records
0530      .WORD LOAD  ;load addr
0540      .WORD INIT  ;init addr
0550 ;
0560 ;Boot continuation
0570 ;
0580      LDA #$3C    ;stop motor
0590      STA PACTL
0600      CLC          ;boot OK
0610      RTS
0620 ;
0630 ;
0640 ;
0650 ;
0660 ;
0670 ;
0680 ; O.S. inits here after boot
0690 ;           & on every Reset
0700 ;
0710 ;-----------------------
```



Graphics galore



Program: Blazing Paddles
Price: £26.95
Supplier: Baudville/ABC Holdings, 53 Cambridge Street, Aylesbury, Buckinghamshire HP20 1RP.
Tel: 0296 27165

OVER the last year there has been an increase in the amount of budget software available for the Atari micros.

The popularity of these programs seems to have overshadowed the full capabilities of the micro, so it was with interest that I viewed Blazing Paddles.

This graphics package offers you more than 250 colours, a range of pre-drawn shapes stored on disc, three variations of text, four different input drawing devices and an icon-driven menu of commands.

You load the program with Basic switched off and the first thing to appear is the Drawing Device menu. This is where you choose your drawing tool – joystick, paddles, touch tablet or trackball.

I found the joystick easiest to use, as the scrolling and medium pace takes you around the screen comfortably, if a little jerkily.

The Touch Tablet requires a Koala Pad – I tried to use my Atari Touch Tablet but as I moved the stylus up, the crosshair cursor moved down. As a result I stuck with the joystick option.

Moving on to the drawing mode, the menu icons are placed across the screen at the top and bottom. This effectively leaves you with only half a screen for your drawing.

Blazing Paddles has the usual range of drawing commands – Clear screen, Text, Lines, Ovals, Solid box, Outline box, Dots, Spray can, Fill and Zoom. Attached to these are the pre-drawn shapes and window features.

The majority of commands are selected by placing the screen crosshair cursor on top of an icon and pressing the fire button. Some of the commands speak for themselves, but others will benefit from a brief explanation.

Window is a visual cut and paste routine. By dragging a dotted outline around a portion of the drawing you want to cut you can send it to a buffer.

This allows you to move a chosen segment around the screen by simply picking the spot and hitting the fire button.

Text can be selected in three sizes and each is double the height of the last, with the smallest similar to the standard Atari character set.

There are two additional styles – italic and bold. But only one style at a time can reside in memory.

Also on disc are three files containing various pre-drawn shapes. When first loaded the program defaults to a set of six shapes which includes buildings and vehicles.

These can be moved using the cursor, flipped from side to side and rotated in 60 degree increments before placing with the fire button. There is also a file of more than 30 musical symbols ready for pasting.

The Colour Selection menu displays 16 colours with up to 16 variations of shade in each. You choose a colour by selecting a playfield register – 0,1,2 or 3 – then you must decide on a main colour and finally on a shade. This procedure is a little time-consuming.

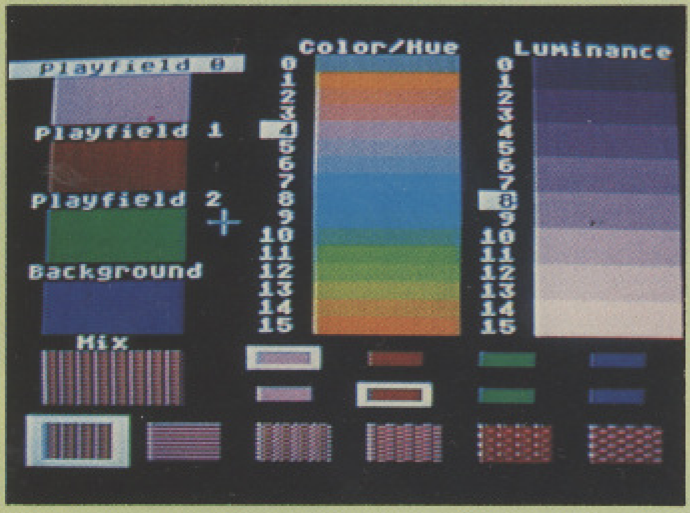
If you take advantage of the six pre-set pattern boxes found at the base of the colour palette screen you can also mix two colours for the patterns. These are a mixture of horizontal and vertical lines in a checkerboard design.

The Spray command produces a stippled effect using a defined colour – although there doesn't seem any method of modifying the nozzle pattern.

A more useful method of drawing is provided by the seven different painting brushes, and a mixture of these can give a very nice effect to your picture.

The Fill option is linked to the colour spectrum and allows you to flood an area with a colour or pattern.

Zoom works by splitting the screen in two The top half is a normal representation of the picture while the bottom shows an expanded view. You can then carry out



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close detail work on enlarged area of the picture.

It's essential that an art package allows you to save your creations, and this one has a reasonable Load and Save feature – which allows you to process pictures, or windows, shapes and character sets.

There are also facilities to view a disc directory, erase a file and format a data disc – all the options you need are included.

Each picture is stored as a 62 sector uncompacted file which is compatible with the Micropainter art pack.

The windowing feature is handy for storing any size blocks of a picture. By cutting a section from your drawing and storing it in the buffer you can move directly to the disc operations and save the block to disc.

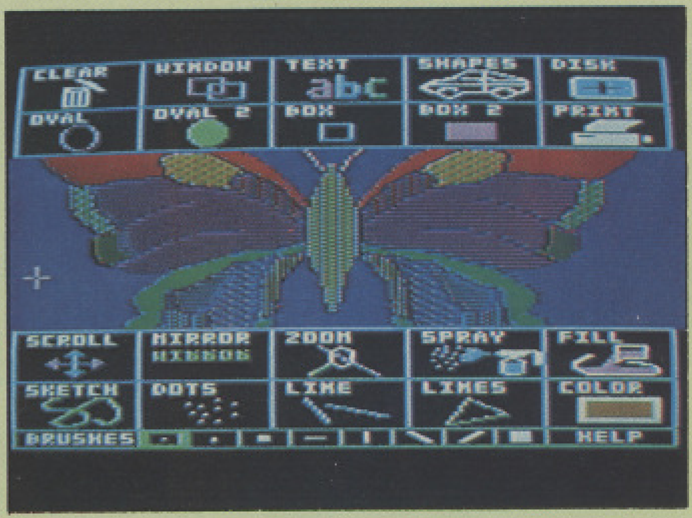
This procedure also works in reverse so blocks can be cut from disc and pasted to the screen. Probably one of the most useful features available is the Undo key, which will cancel your last command and revert to the original display.

A Help file that can be viewed at any time is also included on the disc, but only gives very brief information.

There is one sample picture file and a useful Basic program with a short machine code routine to enable you to display pictures from within your own programs.

Printing your picture is all part of the fun of painting programs, and Blazing Paddles has drivers for Epson, Gemini 10X, Panasonic and Okidata.

Unfortunately the 1029 dot matrix printer is not supported, but as the picture file is saved in the 62 sector format you can always print it out by using the listing for the 1029 printer published in the July 87 issue of *Atari User*.

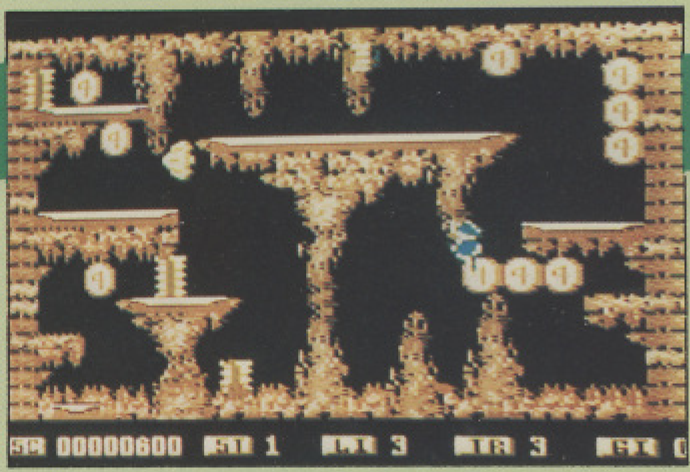


Overall, Blazing Paddles will be of limited use to experienced Atari users as only four colours can be displayed at any time and it doesn't have the range of commands that the Graphics Art Department boasts. Its saving grace is the ease of use, the predrawn shapes and the standard 62 sector format.

Blazing Paddles is a good art package. Though not ideal for experienced computer artists, it is a great introduction to art – and superb for children of all ages.

Alan Goldsbro

Devilish fun



Program: Little Devil
Price: £9.95 (disc), £7.95 (cassette).
Supplier: Red Rat Software, 11-15 Fennel Street, Manchester M4 3DU.
Tel: 061-835 1055

THE Little Devil in question is trapped in the very bowels of Hades.

Now I had always thought that such a place would be the natural sort of habitat for devils of all sizes, but for some reason Old Nick's protege wants out.

To escape his eternal torment in this fiery furnace he must release the scores of lost and lonely souls suffering down below. Having done that he must rescue Linarta, the daughter of Earl Mordred.

If successful, he moves in to further realms, taking him nearer to the Castle Despair where the fair Linarta awaits rescue.

The diminutive demon materialises at the bottom corner of the screen and by jumping and dodging must collect the souls stuck in Limbo.

Out to prevent him are a collection of ghastly ghouls, ghosties and gremlins, which defend their domain with diabolic devotion.

He has the additional problem, of lack of time – strange considering he is stuck in eternity.

An indication of the time elapsed is shown on the souls of the unfortunates, counting down from seven to zero and he will be hard pushed to clear a screen within one lifespan.

Lucifer's demons jealously guard the lost souls. Some home in on him, while others wander around at random or follow set paths.

Also floating around is an energy pill which gives your Bouncing Beelzebub an extra life if you touch it. You are able to gain extra lives a number of times on each screen.

The power pill can occasionally disable the gremlins and ghosties, allowing them to be destroyed for a short period of time – in much the same way as in Pac Man.

The graphics are pleasantly drawn, movement is smooth and game play reasonably paced. The sound effects are adequate, which is more that I can say about the tune.

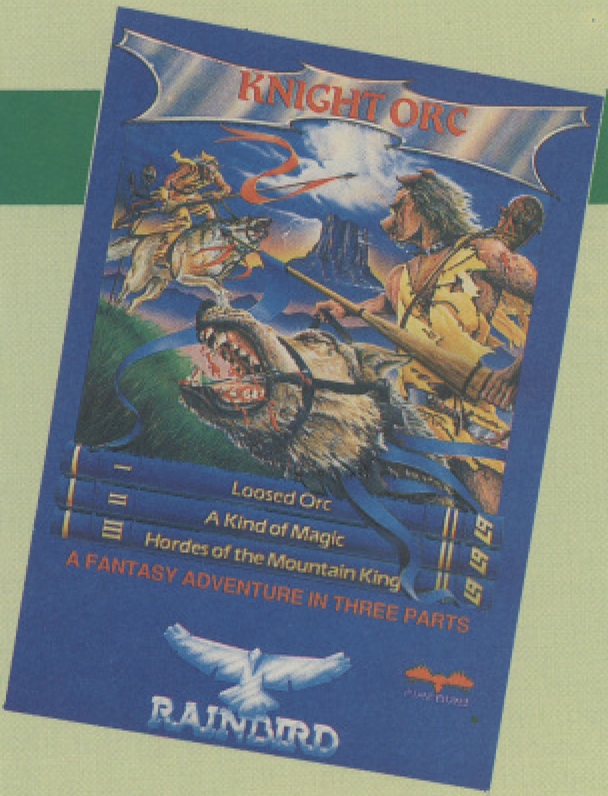
I quite enjoyed what I saw of Little Devil, although I only had a pre-release copy and only the first level was available for inspection.

Even on that rather limited basis I am sure this game will appeal to platform addicts, although bearing the music in mind, perhaps with the proviso that they are tone deaf.

Niels Reynolds

Sound	*6*
Graphics	*7*
Playability	*7*
Value for money	*7*
Overall	*7*

King-sized



Program: Knight Orc
Price: £14.95 (cassette and disc)
Supplier: Rainbird Software, First Floor, 74 New Oxford Street, London WC1A 1PS.
Tel: 01-240 8838

KNIGHT Orc is Level 9's latest release under the Rainbird label and is a major step forward in adventure sophistication.

The game is large – so much so that it is split into three separate parts. Because it is so big, there is no room left for graphics – for Atari 8 bit owners this version is text only.

In most adventures the role of the hero or heroine is normally taken over by the player. Not so in Knight Orc. True, you do play the main part, but in this case the star is an ill-smelling, cowardly Orc by the name of Grindleguts.

Orcs have been persecuted by adventurers for generations – is it possible that you now have a chance to get your own back?

The game starts in splendid style with you being challenged to a fight by a human knight. Only trouble is someone has tied you to your horse so you can't run away, much as you'd like to.

Apparently your erstwhile Orc chums did this to you while you were intoxicated, volunteering you as their champion while you snored on.

Because you're a yellow-streaked, somewhat repellent streak of Orcanity, you'll be spending much of your time running away from potential duffings-up. It seems at times as if the entire population has got a personal grudge against you.

And that's possibly one of the drawbacks with the game. Although a generous helping of personalities is to be desired in an adventure, there are so many characters in Knight Orc (over 70, I believe) that at times you become a little bewildered by all the to-ing and fro-ing, fighting and fleeing.

The huge cast list includes such notables as Rapunzel, the Green Knight, the Annihilator, Brunhilde, Green Sleeves, Jabberwock, Kris the Ant Warrior, Mrs Wallop, Synonym the Wizard and Professor Nutter. Not to be taken too seriously, you see.

Another unusual feature is that no mapping is required. You need simply state where you want to go (major locations are mentioned in the text), and the program will take you step by step along the appropriate route. Go, run and find are the main commands for movement – you can also use them to locate objects which you have previously seen or mislaid.

Characters can be talked to, commanded, followed and even ambushed – the powerful parser allows you to carry out such interesting actions as "Wait for the innkeeper and attack him".

Simultaneous action is possible. For example, you can instruct a character to go off and find something. At the same time as that person is carrying out your instructions, you can continue with your own business.

Magic is also at work in Knight Orc. There are 21 spells to find and learn, and they can be used in unexpected ways. In addition, all is not as it first seems in this game.

Although the plot casts you in the role of an oppressed Orc whose prime objective in Part I is to stay alive long enough to collect enough lengths of rope to cross a bridge into Part II, once there, the notion may slowly dawn on you that something very strange is going on.

There's a neat twist to this adventure, but you'll have to discover it for yourself.

As well as a large cast list, Knight Orc has a vast number of locations. Many are fairly predictable (a wide range of similar arboreal spots in Part I, for example).

In this respect, the game could have done with a bit of tightening up. Given the quantity of characters and locations, the nature of your initial task, and the arbitrary nature of the characters' appearances, Knight Orc has a somewhat unstructured and sprawling feel to it at the beginning. However, perseverance pays off – Parts II and III are better in this respect.

As well as detailed and stimulating text, a powerful parser and a massive vocabulary, the game also has the usual save and restore features including ram save and restore.

Knight Orc has its flaws, the too-large cast list and the too frequent random appearances of the characters being chief among them.

But having said that, the adventure has a lot to offer and is certainly one of the most sophisticated around.

On strict value for money terms, you get a great deal of high quality material, entertainment and play for your cash.

Knight Orc can be a little frustrating and unsatisfying in its early stages but the game is so big and complex that if you persevere, you'll be well pleased with this addition to your adventure collection.

Bob Chappell

Presentation	8
Atmosphere	7
Puzzlement	8
Value for money	8
Overall	8

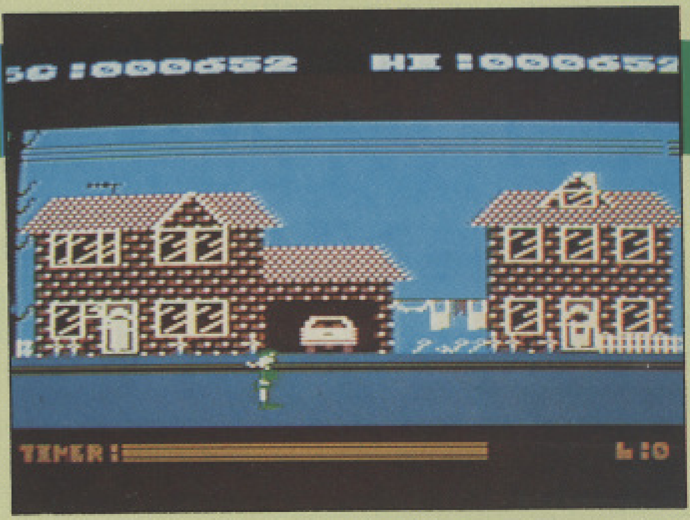
COMING SOON...

To further augment your adventure library you should be on the look out for two new titles from Rainbird. They are offering the more adventurous of you Time and Magik, and Jinxter.

Time and Magik is from the Level 9 team of Mike and Pete Austin. Indeed Level 9's heroine, Ingrid Bottomlow, will be making her adventuring debut any day now in her first role as the Gnome Ranger.

Plundered Hearts, and Nord and Bert Couldn't Make Head Nor Tail Of It, the two new Infocom titles, are also on the edge of release. Ruoloc is looking into them.

No jump for joy



Program: Leapster
Price: £9.95 (disc), £7.95 (cassette)
Supplier: Red Rat Software, 11-15 Fennel Street, Manchester M4 3DU.
Tel: 061-835 1055

I HAD high hopes for Leapster as it loaded. The introductory screen was rather attractive and a nicely harmonised little tune was playing at a fair lick.

I pressed fire to start as instructed. I was greeted by a street scene, a little naive in its rendition perhaps, but inoffensive enough.

The jaunty tune had slowed to a turgid drone, and this was to get progressively more annoying as the game wore on.

Jimmy the Leapster was standing in the middle of the road on the way to school. Someone's mum hadn't taught him the Highway Code that's for sure.

He is apparently on his way to school to free his headmaster.

Anyway there he is, under your control, looking like some demented leprechaun, bowling down the street heading towards onrushing motor cars.

Looking at the houses you see various objects shown fleetingly at one of the four windows in which they may appear.

Jimmy must jump on to the cars, riding them until next to a window with something in it, and then leap at it to grab the object and be awarded points.

He needs to collect objects to progress to the next level.

As you have probably guessed, the level after the High Street is the Nuclear Missile Site – most kids stroll through one on their way to school don't they?

After the missile site there is the Haunted Cemetery and then the school itself.

The pace is on the slow side and once the leaping on to car bonnet stunt is mastered there is little to offer a challenge.

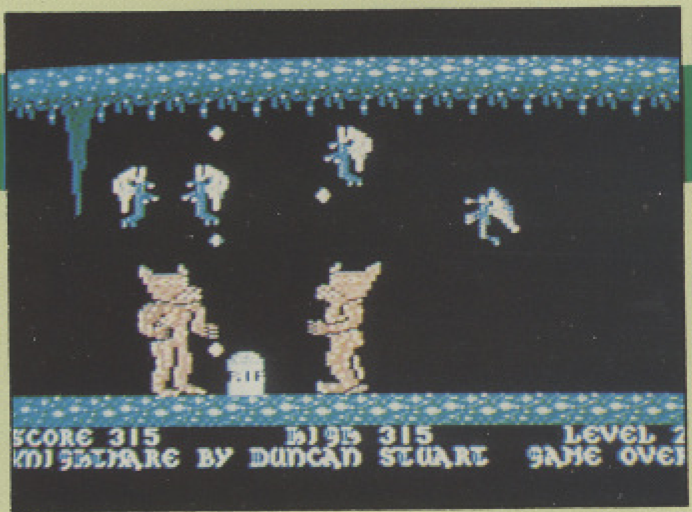
I am afraid that I found the story line a little disjointed, but maybe Red Rat will alter this in the production copy. The company has tried to make a dull game more interesting by including supposedly exciting locations but I'm sorry to say that it doesn't work, and I was left with the feeling that here was a game merely bashed out in time for Christmas.

Red Rat is capable of producing better than this.

Niels Reynolds

Sound	5
Graphics	7
Playability	6
Value for money	6
Overall	6

Don't nod off...



Program: Nightmares
Price: £9.95 (disc) £7.95 (cassette)
Supplier: Red Rat Software, 11-15 Fennel Street, Manchester M4 3DU.
Tel: 061-835 1055

YAWN, it was two in the morning and I was feeling pretty drowsy. The disc drive whirred quietly and my eyes blurred. I'm not entirely sure what happened next, but it was pretty weird.

I looked at my TV screen and there I was, posing like some errant fairy godmother, with a lovely pair of golden wings flapping behind me.

Then things started happening. Blue Airflits started buzzing round me like wasps around a jam pot, sapping my energy as they touched.

Fortunately my magic wand was loaded and I opened fire to try to persuade them to buzz off – but they kept on coming.

Things were to improve however, as I slowly became accustomed to my surroundings. Somewhere deep in my subconscious I had the feeling that I must collect five little pink fairies in order to get into the next level of this strange experience.

Unaccustomed as I am to going round picking up fairies, I nonetheless steeled myself and set off on my quest – although quite what the ultimate aim of it was I still didn't know.

Suddenly out of the ground emerged two Grunts. They were ugly beasts, looking like giant eggs on legs.

These monsters spat globs of energy sucking venom at me and, to make matters worse, they were totally unaffected by my puny magic wand bolts.

Luckily I had noticed that every now and then the wand would shoot out a bomb which really cracked them up, so some defence was at least possible.

This particular task was made more difficult by the fact that the Grunts would usually survive a direct hit. This was partly compensated by their falling to bombs dropping a short way ahead of them.

Having picked up the fairies and despatched sufficient Airflits and Grunts, I bolted for the doorway to the next level. Here I was confronted by enormous red dragons and long-nosed flying sea horses which needed repeated shooting in order to kill them.

The Grunts or the dragons would get me more often than not, but I kept coming back for another go.

I woke up with a start. In front of me lay a pre-release copy of Nightmares, a new title from Red Rat.

It was four in the morning and I was feeling pretty drowsy. The disc drive whirred quietly and my eyes blurred . . .

Paul Mills

Sound	8
Graphics	7
Playability	8
Value for money	7
Overall	8



Button up for the battle

GEORGE O'DONNELL takes a look at an alternative joystick

JOYSTICKS can cause endless problems – they don't move quickly enough and they also wear out rapidly. Star-Trak is a small hand-held pad which puts all possible stick-position and firebutton combinations on to individual keys to overcome these problems. So, for example, you can select "up-left" or "up-left-plus-fire" with a single touch.

It's not the first keypad to hit the market, and some of the others have left a lot to be desired, so I was initially sceptical about testing this one. However, after playing with it for an hour or two, I found myself getting hooked, and wondering why no-one has marketed anything quite like this before.

The first thing you notice is that the pad is easy and comfortable to use. It is equally suitable for left or right-handed players, and the buttons have a crisp, positive feel to them.

I expected that it would take an hour or two to get used to the key layout, but in fact I was blasting away at full speed after only about 15 minutes – which was when I noticed how much it reduces wear and tear on the wrist and trigger finger.

The next thing that hits you is the pad's responsiveness. You know how tricky it can be to get Bounty Bob into precisely the right position before he jumps? Well it's a doddle with this controller – you can move him a couple of millimetres at a time, simply by touching the key briefly. Far more accurate and sensitive than a joystick.

The pad also eliminates a major bane of the arcade-game player's life: Unreliable diagonal movement. Conventional sticks are prone to this problem, because they contain only four switches: Up, down, left and right.

To get diagonal movement, two adjacent switches must be levered down simultaneously, and if you get the stick position slightly wrong, only one of the two gets pressed. The result is horizontal or vertical rather than diagonal movement – very frustrating on games which give you limited space to manoeuvre.

With the Star-Trak pad this can't happen, since there is only one key to press for diagonal movement. An electronic decoder generates the correct signal, so you can't get it wrong.

Another useful feature is a central extra fire button which has three functions controlled by a slide switch. With this switch set to normal, a single touch on the central button produces a single shot which will always deliver, no matter how briefly you press the button.

Set the switch to Auto, and you get conventional auto-fire which blasts away without your touching any key.

But there's also a centre position which gives you Burst action – press the button and you get auto fire, release it and firing stops.

Where this controller really scores, though, is on the latest generation of sports simulations – Karate and Olympics clones – which rapidly hammer joysticks to death and require complex position and/or fire button combinations.

It has now been extensively consumer tested – by me, my wife, two children and the cat – and, with one furry exception, all participants managed to beat their previous high scores on several arcade games, so we're very happy with it.

The controller isn't perfect for every program, though. Conventional joysticks give a more authentic feel on flight and driving simulations, and one or two games involve rotating the joystick rapidly around its eight positions, which is very tricky to do with Star-Trak.

It's worth hanging on to your old joystick for games like these, but for many others, especially the latest generation, the new pad appears to have a definite edge. There are also two other things worth mentioning.

First, it comes complete with a three-metre lead which plugs into the pad rather than being wired permanently in place. You can use this lead with conventional joysticks, or paddles, or anything else that plugs into a joystick port – including Len Golding's gadgets. Nice bonus, that.

Second, the pad is made entirely in this country, and it is evident from the design and construction – yes, I took the back off – that it is built to last.

The switches are all genuine keyboard "click" types – not a rubber membrane in sight – and the rest of the mechanism is solid-state, so there's very little to go wrong. In fact the manufacturers guarantee it for 12 months, which is a good measure of their confidence.

All this makes the price tag of £18.85 look quite reasonable – if it outlasts two joysticks, you've made a profit! And I can see these controllers turning up in a great many Christmas stockings this year.

Product: Star-Trak
Price: £18.85
Supplier: RH Design, 137 Stonefall Avenue, Harrogate, North Yorkshire HG2 7NS.
Tel: 0423 880520

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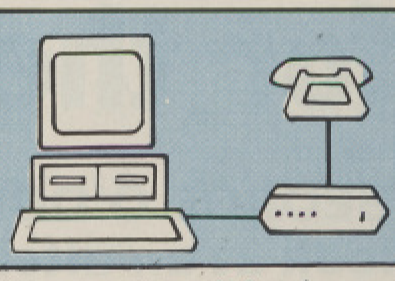
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Two recommended packages

If you have an 850 interface:
Pace Nightingale manual modem + cable (£116.15) PLUS Mini Office II (£19.95).
Total price: £136.10.

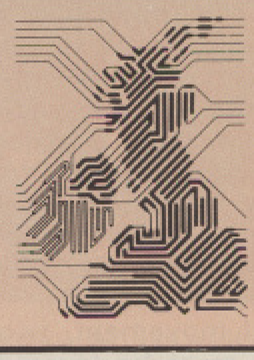
If you don't have an interface:
Miracle WS2000 V21, V23 modem + Datatari interface + cable + Datatari software.
Total price: £149.95.

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ATU12

SNOWBALL

By MATTHEW BERNSTEIN and CASPIAN PRINCE

HERE is a fascinating puzzle game where you take the part of Snowy, a small white snowball trapped inside an ice maze. You want to get outside to play in the snow, but to do this you must solve the secrets of the maze as you look for the solitary secret exit.

To move Snowy you can either use a joystick plugged into port one, or the keyboard. The keys to use are Y for up, B for down, G left and H right. If you get stuck at anytime during the game press the spacebar to melt Snowy and start again.

As you roll around the maze you will notice that Santa has dropped some of his presents and you can pick them up. Each will allow you to traverse a different segment of the maze and may help or hinder you – but this is for you to figure out.

While you're empty-handed you leave a trail of snow behind you and this freezes creating an invisible barrier. Once you've picked up a present the trail becomes coloured.

Santa has also left these clues:

- Do you need all my presents?
- Think where you want to go.
- Some ice is melting.
- What colours are my presents?
- Merry Christmas!

When you type in the program be sure to use Get it Right II! to ensure that you have entered it correctly.

And don't forget to save a copy before you run it as the program uses DLIs which may crash the computer if you make an error.

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AT12

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PROGRAM BREAKDOWN

60 – 140	Title
150 – 220	Character set redefined
230 – 280	DLI to flash title
290 – 580	Draw maze and presents
590 – 990	Main loop
1000 – 1210	Escape from the maze routine

VARIABLES

X, Y	Coordinates of snowball
XM, YM	Movement of the snowball
C, D, P	What the snowball is on
NO, OBJ	Presents the snowball has collected
SWF	Melting snow
CH	Type of snow trail
A, A$	Key input
DL	Display list pointer
RT, RM	Character set pointers

```
10 REM SNOWBALL
20 REM BY MATTHEW BERNSTEIN
30 REM AND CASPIAN PRINCE
40 REM (c)ATARI USER
50 GRAPHICS 17:POKE 16,64:POKE 53774,6
4:POSITION 6,22:POKE 731,1:POKE 711,0
60 REM TITLE SCREEN
70 GOSUB 140:POKE 756,RT
80 ? #6;"▲▼▛▙▟▟":REM INV CTRL-F,CTRL
-G,CTRL-H,CTRL-I,CTRL-J,CTRL-K,CTRL-L,
CTRL-L
90 FOR I=0 TO 15:SOUND 0,255,6,I:SOUND
 1,0,8,I:POKE 711,I:FOR J=1 TO 20:NEXT
 J:NEXT I
100 FOR I=15 TO 0 STEP -1:SOUND 0,255,
6,I:SOUND 1,0,8,I:POKE 711,I:FOR J=1 T
O 20:NEXT J:NEXT I
110 POKE 559,0
120 GOTO 280
130 REM INITIALISE SCREEN
140 POKE 559,0
150 REM REDEFINE CHARACTERS
160 REM  (ENTIRE NEW SET!)
170 RT=PEEK(106)-8:RM=RT*256
180 DATA 0,0,0,0,0,0,0,0,102,60,126,
126,60,102,0,0,0,24,231,231,0,231,231,
0,16,108,108,0,108,108,108
190 DATA 0,102,60,126,126,60,102,0,0,6
0,122,126,126,126,60,0,63,127,192,254,
127,31,254,252
200 DATA 99,115,123,127,127,111,103,99
,62,127,127,119,119,127,127,62,99,107,
107,127,127,127,119,99
210 DATA 126,127,119,126,127,119,127,1
26,28,62,127,119,99,127,127,99,112,112
,112,112,112,112,127,127
220 FOR I=0 TO 103:READ D:POKE RM+I,D:
NEXT I
230 REM SET UP A DLI
240 DATA 72,173,10,210,141,20,141,10,2
12,141,22,208,104,64
250 FOR I=1536 TO 1549:READ D:POKE I,D
:NEXT I
260 DL=PEEK(560)+256*PEEK(561):POKE DL
+24,134:POKE 512,0:POKE 513,6:POKE 542
86,192:POKE 559,34
270 RETURN
280 POSITION 0,0
290 REM DRAW SCREEN
300 ? #6;"!!!!!!!!!!!!!!!!!!!!";
310 ? #6;"!▦  !    %  !      !";
320 ? #6;"!!! ! !  !         !";
330 ? #6;"!█!   !! !!!!  !!  !";
340 ? #6;"! ! !!!  ! ▟    !  !";
350 ? #6;"! !   ! !! !    !  !";
360 ? #6;"! !!! !  ! ! !  !  !";
370 ? #6;"! !   !!$! ! !  !  !";
380 ? #6;"! ! !   ▜!   !  !  !";
390 ? #6;"! ! !!!!!!!!!!  !  !";
400 ? #6;"! !   !         !  !";
410 ? #6;"! ! ! !█        !  !";
420 ? #6;"! ! ! !!!!!!!!!!!  !";
430 ? #6;"!   !     !   █!   !";
440 ? #6;"! !!!!!!$!! !  ! ! !";
450 ? #6;"!     !♥    ! !!!! ! !";
460 ? #6;"! !! !! ! ! !    ! !";
470 ? #6;"!!!! !! ! ! !  | ! !";
480 ? #6;"!        ! !   !   !";
490 ? #6;"!!!!!!!!!!!!!!!!!!!!";
500 REM Lines 270 & 310 : CTRL-C
510 REM Lines 340 & 400 : CTRL-B
520 REM Line 380 : Control-,
530 POKE 709,52:POKE 710,198:POKE 711,
134:POSITION 6,22
540 ? #6;"&'()*+,,":REM INV CTRL-F,CTR
L-G,CTRL-H,CTRL-I,CTRL-J,CTRL-K,CTRL-L
,CTRL-L
550 POKE 756,RT:POKE 708,0:POKE 559,34
560 FOR I=0 TO 15:SOUND 0,255,I,15-I:P
OKE 708,I:FOR J=1 TO 20:NEXT J:NEXT I
570 X=9:Y=1:C=7:D=0:SWF=0
580 OPEN #1,4,0,"K:":DIM A$(1):D=7
590 REM MAIN LOOP
600 POKE 77,0:IF PEEK(764)<>255 THEN G
ET #1,A:A$=CHR$(A):GOTO 630
610 IF STICK(0)<>15 THEN A$="":GOTO 63
0
620 GOTO 600
630 IF A$="Y" OR STICK(0)=14 THEN YM=-
1:XM=0:GOTO 690
640 IF A$="B" OR STICK(0)=13 THEN YM=1
:XM=0:GOTO 690
650 IF A$="G" OR STICK(0)=11 THEN YM=0
:XM=-1:GOTO 690
660 IF A$="H" OR STICK(0)=7 THEN YM=0:
XM=1:GOTO 690
670 IF A$=" " THEN RUN
680 GOTO 600
690 NO=0:LOCATE X+XM,Y+YM,P:IF P=33 OR
 P=193 THEN 840
700 IF P=2 THEN D=1:GOTO 850
710 IF P=162 THEN D=2:GOTO 850
720 IF P=130 THEN D=3:GOTO 850
730 IF P=3 THEN D=4:GOTO 850
740 IF P=0 THEN D=5:GOTO 850
750 IF P=163 AND C=4 THEN D=6:GOTO 850
760 IF P=160 AND C=5 AND OBJ=6 AND SWF
 THEN 1020
770 IF P=160 THEN NO=1:GOTO 850
780 IF P=32 OR P=131 THEN NO=1:GOTO 85
0
790 IF P=1 AND (C=2 OR C=6) THEN NO=1:
GOTO 850
800 IF P=129 AND C=1 THEN NO=1:GOTO 85
0
810 IF P=128 AND C=4 THEN NO=1:GOTO 85
0
820 IF P=36 AND C=6 THEN SWF=1:NO=1:GO
TO 850
830 IF P=161 AND C=5 THEN NO=1:GOTO 85
0
840 SOUND 0,0,4,8:SOUND 1,255,4,8:FOR
I=1 TO 60:NEXT I:SOUND 0,0,0,0:SOUND 1
,0,0,0:GOTO 600
850 IF C=1 THEN CH=1:GOTO 920
860 IF C=2 THEN CH=161:GOTO 920
870 IF C=3 THEN CH=129:GOTO 920
880 IF C=4 THEN CH=1:GOTO 920
890 IF C=5 THEN CH=128:GOTO 920
900 IF C=6 THEN CH=161:GOTO 920
910 IF C=7 THEN CH=128:GOTO 920
920 FOR I=14 TO 0 STEP -2:SOUND 0,8,8,
I:NEXT I
930 POSITION X,Y:? #6;CHR$(CH);:X=X+XM
:Y=Y+YM:POSITION X,Y:? #6;"%";:C=D
940 IF P=131 THEN OBJ=OBJ+1:FOR I=255
TO 0 STEP -16:SOUND 0,I,10,6:NEXT I:SO
UND 0,0,0,0
950 IF NO=0 THEN OBJ=OBJ+1:IF C<>5 THE
N FOR I=255 TO 0 STEP -16:SOUND 0,I,10
,6:NEXT I:SOUND 0,0,0,0
960 IF RND(0)<0.98 THEN 600
970 SOUND 0,243,10,6:SOUND 1,121,10,6:
SOUND 2,60,10,6:SOUND 3,29,10,6:FOR I=
1 TO 50:NEXT I
980 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND
2,0,0,0:SOUND 3,0,0,0
990 GOTO 600
1000 REM INTELLIGENT HUMAN
```

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```
1010 REM FINISHES THE GAME
1020 FOR I=15 TO 1 STEP -1
1030 FOR P=0 TO 255 STEP 20
1040 SOUND 0,P,4,I
1050 POKE 708,I:POKE 709,I+48:POKE 710
,I+192:POKE 711,I+128:NEXT P:NEXT I
1060 GRAPHICS 17:POSITION 6,0:POKE 711
,0:POKE 756,RT:POKE 708,0
1070 ? #6;"[graphics characters]":REM INV CTRL-F,CT
RL-G,CTRL-H,CTRL-I,CTRL-J,CTRL-K,CTRL-
L,CTRL-L
1080 ? #6:? #6:? #6;"  MERRY CHRISTMAS
!"
1090 FOR I=0 TO 15:SOUND 0,255,6,I:SOU
ND 1,0,8,I:POKE 711,I:FOR J=1 TO 20:NE
XT J:NEXT I
1100 FOR I=15 TO 0 STEP -1:SOUND 0,255
,6,I:SOUND 1,0,8,I:FOR J=1 TO 20:NEXT
J:NEXT I
1110 DL=PEEK(560)+256*PEEK(561):POKE 5
4286,64:POKE DL+6,134:FOR I=1536 TO 15
46:READ D:POKE I,D:NEXT I
1120 DATA 72,169,224,141,10,212,141,9,
212,104,64
1130 POKE 512,0:POKE 513,6:POKE 54286,
192
1140 FOR I=0 TO 3:POKE 708,0:FOR J=0 T
O 10:NEXT J:POKE 708,12+I:FOR J=0 TO 1
0:NEXT J:NEXT I
1150 FOR I=1 TO 30:READ N0,N1,D:SOUND
0,N0,10,8:SOUND 1,N0+1,10,6:SOUND 2,N1
,10,4:SOUND 3,N1+1,10,2
1160 FOR J=1 TO D*20:NEXT J:SOUND 2,0,
0,0:SOUND 3,0,0,0:SOUND 2,N1,10,4:SOUN
D 3,N1+1,10,2:FOR J=1 TO D*20:NEXT J
1170 SOUND 0,0,0,0:SOUND 1,0,0,0:SOUND
 2,0,0,0:SOUND 3,0,0,0:NEXT I
1180 DATA 91,91,1,68,108,1,68,108,.4,6
0,108,.4,68,108,.4,72,108,.4,81,102,1,
81,102,1,81,102,1,60,96,1,60,96,.4,53
1190 DATA 96,.4,60,96,.4,68,96,.4,72,9
1,1,91,91,1,91,91,1,53,68,1,53,68,.4,5
0,68,.4,53,68,.4,60,68,.4,68,102,1,81
1200 DATA 102,1,91,91,.4,91,91,.4,81,1
02,1,60,91,1.2,72,91,1.4,68,136,5
1210 GRAPHICS 0:POKE 764,255:END
```

Get it right! II

10 CP1 (Y)	210 XG4 (F)	410 H9K (R)	610 9D7 (V)	810 75T (1)	1010 DON (E)
20 CP2 (3)	220 NR4 (X)	420 4JJ (P)	620 QSD (C)	820 NRS (R)	1020 GDM (P)
30 CP3 (X)	230 D7T (K)	430 4GL (4)	630 4HR (O)	830 7GT (3)	1030 LRL (P)
40 CP4 (4)	240 USD (S)	440 4XH (9)	640 3MR (4)	840 6XJ (U)	1040 381 (9)
50 NOT (O)	250 NKW (O)	450 4LP (U)	650 185 (6)	850 LR9 (Q)	1050 X77 (X)
60 CP6 (R)	260 8CA (P)	460 4QD (K)	660 896 (K)	860 UPC (Y)	1060 PTW (D)
70 4AX (D)	270 S26 (X)	470 4UF (S)	670 9C1 (O)	870 UXC (Q)	1070 U4V (1)
80 R90 (J)	280 Y3D (1)	480 51E (8)	680 RJD (K)	880 MH9 (Y)	1080 D3Y (P)
90 CSH (E)	290 DYT (8)	490 5HC (S)	690 10W (E)	890 VF3 (U)	1090 7J1 (8)
100 P3K (2)	300 4DA (T)	500 CUW (L)	700 LLF (T)	900 UFD (L)	1100 76S (V)
110 S8Y (8)	310 874 (8)	510 CYW (S)	710 LMT (9)	910 UP4 (L)	1110 USV (K)
120 QS7 (R)	320 45J (X)	520 D3W (K)	720 LJA (A)	920 Q7R (V)	1120 767 (O)
130 D7S (Q)	330 8L9 (O)	530 3M5 (Q)	730 M9F (W)	930 9FE (M)	1130 4T3 (F)
140 SMY (Y)	340 47C (F)	540 OEK (A)	740 M3F (8)	940 HV1 (C)	1140 HW7 (6)
150 DGS (L)	350 4MN (Q)	550 7SV (C)	750 3J2 (8)	950 2EV (G)	1150 U4E (E)
160 DLS (X)	360 4Q3 (1)	560 ATJ (3)	760 SWV (M)	960 JH6 (T)	1160 813 (H)
170 R03 (P)	370 56Q (T)	570 AG4 (E)	770 RMJ (L)	970 T3K (P)	1170 UY4 (7)
180 TYM (C)	380 C4K (2)	580 ULK (K)	780 5AF (R)	980 CQV (H)	1180 A5M (J)
190 D4D (N)	390 59J (E)	590 DYW (V)	790 N3R (1)	990 RNG (E)	1190 901 (Q)
200 T7T (Q)	400 3WF (S)	600 QAC (X)	800 6YT (U)	1000 CXN (C)	1200 AXA (P)
					1210 W53 (9)

Bargain basement

ALAN GOLDSBRO expands his Atari's DTP capabilities with The Print Shop Companion



DESKTOP Publishing is all the rage now, but for many users it was the 8 bit Atari and Print Shop which gave them an insight into this field. Print Shop from Broderbund was made available in late 1985 and ever since then it's been the only usable Atari 8 bit program within the desktop publishing format.

Not to be outdone by its 16 bit cousins where this type of program is very popular, Broderbund has released The Print Shop Companion as the perfect partner for The Print Shop.

Like the Print Shop, the Companion is easy to use, foolproof and a whole lot of fun. It expands the capabilities of Print Shop and adds a series of Editors, new Fonts, Borders and Icons. Even though you can use the Companion as a standalone program, to get the most from it you'll need to have The Print Shop.

To achieve true compatibility, the original Print Shop disc has to be modified by the Companion – this means updating selective files so it can recognise borders and fonts from the Companion, and the Companion copies the set up information from the Print Shop disc to the Companion disc.

Once this has been achieved the original blue background colour of the Print Shop should turn to black.

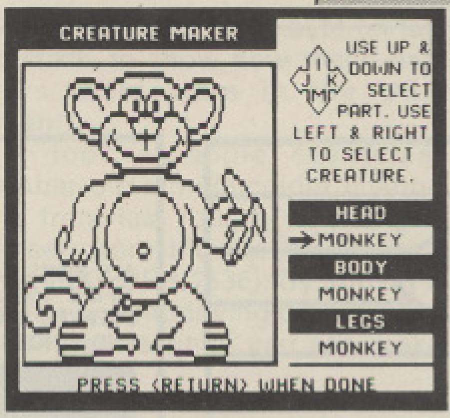
The Print Shop Companion is as easy to use as the original Print Shop and follows the same menu driven system. Working from the menu, the first option is the Graphic Editor+. This has all the commands of the original editor – with one exception: The wrapround cursor.

The extra commands available make up for this though – four mirror modes, text, and numbers, insert/delete row/column, flip horizontal or vertical, negative (black) or positive (normal) line commands, rays, boxes and ovals. There is even a locking mode for drawing, plus 17 fill patterns, a flood fill and a very welcome undo key.

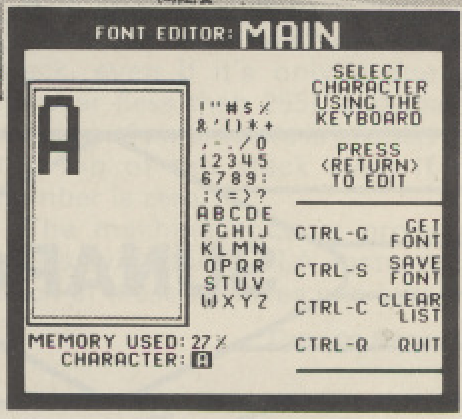
The best feature has to be the Superimpose key. Icons can be placed side by side or top to bottom on the one



Main menu



Creature maker menu



Font editor menu

screen, then saved to disc as a complete icon – marvellous!

The best way to visualise this is when when working with the date format. There are 20 number graphics, 0 – 9 in both left and right positions and the four date endings – st, nd, rd and th. All can be superimposed and making a date such as 20th has never been so easy.

There are 50 new border selections to choose from on the Print Shop Companion disc and if you ever get tired of them you can always create your own with the Border editor.

The editing area consists of three edit boxes, representing the four corners, top and bottom, and the sides respectively. There are x and y coordinations to help you in placing the pixels in the grid. As you draw, the border is displayed as a whole unit which gives you an overall view of how the completed unit will look.

You can copy any of the edit boxes to another one, but unfortunately this does not let you retrieve graphic Icons and place them in the edit boxes.

There are a number of commands available such as Get, Save, Print, Clear and Lock – these are standard features right the way through the Companion disc. Of the other commands, flip horizontal, vertical, or negative are as you would expect, and the bottom and right sections of the border can be flipped to make a mirror image of the top and left sides of the border respectively.

The Companion's Font Editor lets you add your own personalised fonts, either by editing any of the 20 fonts from Print Shop and Companion or by designing your own. The creation of fonts is a complicated and time consuming process which can really test your dedication to computing!

If you wish to edit a font, say to add a £ sign – because its an American

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program there's only the $ – or perhaps a series of graphical characters instead of text, then load up an existing font and edit away.

To create an entirely new font takes considerable patience and an understanding of how text is created in the first place – the best way is to use the built-in reference font.

This comes in three sizes: Small, medium or large. The larger the font, the greater the memory used – a small font takes up about 27 per cent while a large font can use up to 90 per cent of file memory.

Designing or creating fonts is difficult, but there are plenty of commands available to assist you. Should you begin to master the font editor there is even a command to flip the font backwards.

The Tile magic feature provides an array of 11 moving patterns very similar to the kaleidoscopes in the original Print Shop. Unlike the kaleidoscopes though, these can be saved to disc or passed directly to the Graphic Editor+ where you can add your own touches. The tiles can be made to enhance backgrounds by "flooding" them together before superimposing text on your card and poster layouts.

In similarity, Creature Maker allows you to create original graphics by mixing and matching body parts. There are 1000 possible combinations which can be saved to disc and, like the tile magic, passed instantly to the Graphic Editor+ for personalised touches.

Print Shop Companion has an excellent calendar facility, creating either weekly or monthly calendars with Print Shop graphics and choice of fonts. The calendar has a date range from 1753 to 9999. Graphics can be positioned across the top of the page in two sizes. Text choices are from standard, outlined or 3D and it can be placed in each day to highlight important events, up to a 120 characters for each day in the weekly versions and 112 characters for the monthly one.

Finally, not only can your designs be printed out but they can also be saved to disc and edited as and when required.

There are a couple of mini-features to Print Shop Companion which don't really fit a specific category. For example there are 20 bonus graphics from Broderbund software characters, and you have the opportunity to leave Print Shop Companion and load up the Print Shop disc without rebooting.

Using Print Shop is tremendous fun and with the addition of Print Shop Companion, Broderbund has made an excellent package for the Atari 8 bit market. I feel the Tile magic and Creature maker are mainly for the kids – certainly they won't get used much by me – but on the other hand the calendar is brilliant, the Graphic Editor+ a wondrous improvement on the original and the border and font editors extremely welcome.

If you've already got Print Shop then buying the companion will be money well spent. If you are without, then there's a whole lot of exciting projects out there just waiting for you to try. Your printer will never forgive you for missing it!

Product: The Print Shop Companion
Supplier: Broderbund/US Gold, Units 2/3 Holbard Way, Holbard, Birmingham, B6 7AX
Tel: 021-356-3388
Price: £29.95

The USR function

LEN GOLDING concludes his look at this powerful command

LAST month we looked at USR in its simplest form: X=USR(ADDRESS). But you have probably come across listings which contain far more complex statements such as: X=USR(ADDRESS,100,A,B*5). Let's look how extra numbers and variables like these can be used in your own programs.

No matter how many things there are in the brackets, the first one is always the address of your machine code routine. It can be a real number, a variable name or an expression – such as ADR(A$) or 256*PEEK(106) – so long as its value is equal to the exact start address of your routine. All the other values in the brackets are called *parameters* or *arguments*.

As far as USR is concerned, they are just ordinary numbers, not addresses or machine code instructions or anything else complicated. You can have up to 127 different parameters, and each one can be a real number, a variable name or an expression, so long as its value does not exceed 65535.

The USR function automatically stores these parameters in a form that can easily be retrieved by your machine code routine. So you can use Basic to do calculations which machine code finds difficult – complex arithmetic, for example – then transmit the result to your machine code routine for action.

This simplifies the machine code programming enormously, so it's a worthwhile technique to master. Here's how it works.

The 6502 processor uses a special memory area known as the Stack – think of it as a long, vertical tube, closed at the bottom end. Data can be pushed into it or pulled out of it one byte at a time, but you have access only to the one on top. If you wanted to retrieve, say, the third byte down, you would first have to remove the top two bytes.

Now the first thing USR does is to note its current position in the Basic program, so that it can return later, and pushes this two-byte address onto the stack, low byte first.

Next it takes the parameters in turn, reading from right to left, and converts each into a two-byte integer. The parameter divided by 256 gives the high byte, and the whole-number part of whatever remains is the low byte.

It pushes each of these two-byte values on to the stack, low byte first, and finally puts one more byte on top of the stack, to show how many parameters there were in the USR statement.

Let's look at some examples. Remember our simple colour change routine from last month? It changed the screen from blue to black when you typed X=USR(1536). By adding a parameter and modifying the machine code program slightly you can make the screen change to any colour you want.

Program I shows the new routine, and Program II is the Basic translation.

The routine is called using X=USR(1536,C), where C is a number from 0 to 255 which will control the screen colour. On execution of this statement, the stack will start off looking like this:

Top of Stack		
1		number of parameters
C	Hi	high byte of 'colour' parameter (must=0)
C	Lo	low byte of 'colour' parameter (0 to 255)
R	Hi	high byte of return address
R	Lo	low byte of return address

It is vital to remember that every parameter pushes two bytes on to the stack, even if it's only a one-byte number (less than 255), and that the number of parameters is pushed on to the top of the stack even if that number is zero.

The machine code in program I starts with three PLA instructions. Each of these removes one byte from

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```
10 *=$600
20 PLA        Discard 'number of parame
ters' (=1)
30 PLA        Discard high byte of para
meter (=0)
40 PLA        Low byte = required scree
n colour
50 STA 710    Store it in the colour re
gister
60 RTS        Return to Basic
```

Program I: Modified screen colour change routine

```
10 FOR X=0 TO 6:READ D:POKE 1536+X,D:N
EXT X
20 DATA 104,104,104,141,198,2,96
30 C=18:REM Desired screen colour, 0 t
o 255
40 X=USR(1536,C)
```

Get it right! II

```
10 MW6 (6)
20 JVE (7)
30 MHJ (K)
40 SH2 (C)
```

Program II: Basic loader for Program I

```
10 CDTMA2=$228
20 CDTMV2=$21A
30 CHACT=$2F3
40 *=$600
50 ;This routine is called by: X=USR(1
536,SWITCH,RATE). SWITCH controls the
60 ; ON/OFF function; RATE controls th
e flash frequency. Neither number may
exceed 255
70 SETVEC
80 PLA                      Number of
 parameters (=2)
90 PLA                      High byte
 of SWITCH (=0)
0100 PLA                    Low byte
of SWITCH
0110 STA CONTROL            = "on" or
"off" command
0120 PLA                    High byte
 of RATE (=0)
0130 PLA                    Low byte
of RATE
0140 STA DELAY              = desired
 flash rate
0150 LDA #START&255         Tell the
computer where the
0160 STA CDTMA2             "blink" r
outine starts - it
0170 LDA #START/256         will JSR
through this address
0180 STA CDTMA2+1           when CDTM
V2 counts down to 0
0190 START
0200 LDA CONTROL            Flash rou
tine wanted?
0210 BNE BLINK              Branch if
 yes
0220 LDA #2                 Else make
 sure cursor
0230 STA CHACT              is opaque
0240 RTS                    and retur
n to Basic
0250 BLINK
0260 LDA CHACT              Read cont
ents of 755
0270 EOR #2                 Change fr
om 2 to 0
0280 STA CHACT
0290 LDA DELAY              Reset fla
sh rate every
0300 STA CDTMV2             time the
routine is called
0310 RTS                    Return to
 Basic
0320 CONTROL *=*+1
0330 DELAY *=*+1
```

Program III: Modified flashing cursor routine

◀ *From Page 25*

the top of the stack and puts it into the 6502 Accumulator. Line 20 removes the number of parameters byte, which is of no interest to us so we don't do anything with it.

Line 30 takes out the high byte of our parameter, which in this particular case must be 0, since you can't store more than 255 in a colour register. So, again, it is discarded.

The final PLA retrieves the parameter's low byte, which is the true value of C, and line 50 stores it into colour register 2. The RTS instruction at line 60 pulls the two remaining bytes off the stack, converts them into a two-byte address, and terminates the USR routine by jumping to that address in ram.

All being well, this will restore control to your Basic program at the statement immediately following the USR call.

Everything above the return address must be removed from the stack before the final RTS is executed, otherwise the computer will wander off into never-never land and your program will crash.

That's why every USR routine must contain at least one PLA instruction – to remove the number of parameters byte – even if there are no parameters.

Programs III and IV are a bit more interesting: They are based on last month's flashing cursor routine. By using parameters you can gain control over the flash rate, and switch the routine on or off at will.

The variable *SWITCH* turns the routine off if it's zero or on if it's non-zero, while *RATE* controls the flash frequency. Neither parameter may exceed 255, so at the start of this routine the stack will look like this:

2	Number of parameters
SWITCH Hi	High byte of SWITCH (must=0)
SWITCH Lo	Low byte of SWITCH
RATE Hi	High byte of RATE (must=0)
RATE Lo	Low byte of RATE
R Hi	High byte of return address
R Lo	Low byte of return address

Notice in Program III how the parameters are pulled off the stack in turn, and used by the machine code routine.

Programs V and VI contain a simple routine for wiping a specified area of ram – useful when you're setting up player/missile graphics or page flipping. The example given clears four pages (1024 bytes) of ram starting at address 20000, but you can change

```
10 FOR X=0 TO 46:READ D:POKE 1536+X,D:
NEXT X
20 DATA 104,104,104,141,47,6,104,104,1
41,48,6,169,21,141,40,2,169,6,141,41
30 DATA 2,173,47,6,208,6,169,2,141,243
,2,96,173,243,2,73,2,141,243,2
40 DATA 173,48,6,141,26,2,96
50 SWITCH=1:REM Set flash routine ON (
0 means OFF)
60 RATE=8:REM Set flash frequency (0 t
o 255)
70 X=USR(1536,SWITCH,RATE)
```

Get it right! II

```
10 TST (8)   50 UEL (R)
20 MOT (R)   60 U8D (M)
30 EV5 (G)   70 JLC (4)
40 H9L (E)
```

Program IV: Basic loader for Program III

the parameters to suit yourself.

In this example the parameter values exceed 255, so both bytes of the integer are relevant. If you can work out how the stack operates in this routine you've mastered the technique of parameter passing.

Having come this far, you will now want to write routines of your own, and this involves translating machine language source code into Basic DATA statements.

Doing this by hand is tedious and error-prone so, as promised last month, Program VII is designed to do all the hard work for you.

First write your source code and check that it assembles correctly. Next

```
10 ;Call by X=USR(1536,A,N)
20 START=$CB
30  *=$600
40  PLA              Number of paramet
ers
50  PLA              High byte of A
60  STA START+1
70  PLA              Low byte of A
80  STA START
90  PLA              High byte of N (=
0100  STA SIZE+1     Number of pages)
0110  PLA            Low byte of N (=
0120  STA SIZE       remaining bytes)
0130  LDA #0
0140  TAY
0150  LDX SIZE+1     Branch if less th
an
0160  BEQ REMAIN     1 page to erase
0170 LOOP
0180  DEY            Erase all complet
e pages
0190  STA (START),Y
0200  BNE LOOP
0210  INC START+1
0220  DEX
0230  BMI EXIT
0240  BNE LOOP
0250 REMAIN
0260  LDY SIZE       Erase remaining b
ytes
0270  BNE LOOP
0280 EXIT
0290  RTS            Return to Basic
0300 SIZE *=*+2
```

Program V: Erase N bytes of ram, starting at address A

store it on disc or cassette in assembled form – this is the object code file. There's a bug in Atari's Assembler Editor cartridge which makes it difficult to assemble a program directly to cassette, so assemble it to ram first, then use SAVE #C: to make the cassette file.

Disc systems do not have this problem: you can use ASM,,#D:[filename] to create the object file in a single operation. Now go back into Basic, run

```
10 FOR X=0 TO 40:READ D:POKE 1536+X,D:
NEXT X
20 DATA 104,104,133,204,104,133,203,10
4,141,42,6,104,141,41,6,169,0,168,174,
42
30 DATA 6,240,12,136,145,203,208,251,2
30,204,202,48,7,208,244,172,41,6,208,2
39,96
40 START=20000:REM Start of RAM area t
o be wiped
50 BYTES=1024:REM Number of bytes to c
lear
70 X=USR(1536,START,BYTES)
```

Get it right! II

```
10 TSF (4)   40 SAT (T)
20 T40 (S)   50 S1X (E)
30 TMC (Y)   70 JYJ (7)
```

Program VI: Basic loader for Program V

Program VII and follow the instructions as they appear on the screen. Your source code will be turned into DATA statements, complete with line numbers, which you then store in LISTed form so that they can be merged into any Basic program.

Now you have mastered USR, a whole new programming world is waiting. You can use system timers, write vertical blank interrupt routines, experiment with fine scrolling, customise parts of the operating system, talk directly to CIO, produce fast player/missile graphics and much, much more.

In fact you've taken the first step along the road to becoming a fully-fledged machine code programmer.

```
31999 REM PROGRAM 14: Converts object
code files into DATA statements.
32000 DIM A$(1),B$(16),C$(8),D$(12)
32010 ? CHR$(125):? "Using disk or cas
sette? (D or C)":INPUT A$
32020 IF A$="C" THEN B$="C:":C$="casse
tte":D$="object file":GOTO 32070
32030 IF A$="D" THEN B$="D:":C$="disk"
:GOTO 32050
32040 GOTO 32010
32050 ? :? "Input name of file":? "con
taining object code"
32060 INPUT D$:B$(LEN(B$)+1)=D$
32070 ? :? "Insert ";C$;" containing "
;D$:? "and press START"
```

Turn to Page 28 ▶

Program VII: Convert code into DATA

◀ From Page 27

```
32080 GOSUB 32470
32090 OPEN #1,4,0,B$
32100 GET #1,X:GET #1,X
32110 GET #1,X:GET #1,Y
32120 START=X+256*Y:S=START
32130 GET #1,X:GET #1,Y
32140 START=PEEK(106)-32:POKE 106,STAR
T:GRAPHICS 0:START=START*256
32150 ? CHR$(125):? "START ADDRESS = "
;S:?
32160 TRAP 32190:X=0
32170 GET #1,A:POKE START+X,A
32180 X=X+1:GOTO 32170
32190 CLOSE #1
32200 TRAP 32200:POKE 752,1:? :? "NUMB
ER OF BYTES = ";X:FINISH=START+X-1
32210 POSITION 2,14:? "Press START to
convert code into"
32220 ? "DATA statements for use by Ba
sic"
32230 GOSUB 32470
32240 TRAP 32240:? CHR$(125)
32250 ? "At what line number do you wa
nt the":? "DATA statements to start?"
32260 INPUT LINE:LSTART=LINE:? CHR$(12
5)
32270 BYTE=0
32280 ? :? :? LINE;" DATA ";
32290 ? PEEK(START+BYTE);",";
32300 BYTE=BYTE+1
32310 IF START+BYTE>FINISH THEN GOSUB
32490:GOTO 32350
32320 IF BYTE/80=INT(BYTE/80) THEN GOS
UB 32490:LINE=LINE+10:? :GOTO 32280
32330 IF BYTE/20=INT(BYTE/20) THEN ? C
HR$(126):LINE=LINE+10:GOTO 32280
32340 GOTO 32290
32350 ? "Data encoding finished at lin
e ";LINE
32360 IF A$="D" THEN B$="D:DATAFILE.TM
P"
32370 ? :? "1. Insert new ";C$;" if ne
cessary"
32380 ? :? "2. Press RETURN to create
the DATA file"
32390 ? :? "DATA statements recorded i
n this way"
32400 ? "may then be merged with any e
xisting"
32410 ? "program, using the command":?
 "ENTER";CHR$(34);B$;CHR$(34)
32420 POKE 752,0:POSITION 2,20
32430 ? "LIST ";CHR$(34);B$;CHR$(34);"
,";LSTART;",";LINE:POSITION 2,18
32440 TRAP 32460
32450 END
32460 ? CHR$(125):? "ERROR ";PEEK(195)
:GOTO 32370
32470 IF PEEK(53279)<>6 THEN 32470
32480 RETURN
32490 ? CHR$(126):? "CONT":POSITION 2,
0:POKE 842,13:STOP
32500 POKE 842,12:? CHR$(125):RETURN
```

Get it right! II

31999 E3N (L)	32250 NMF (S)
32000 MVU (N)	32260 MA9 (W)
32010 NDW (H)	32270 TL1 (U)
32020 Q3R (V)	32280 HTP (A)
32030 4WX (N)	32290 RCV (8)
32040 UC5 (G)	32300 WFD (5)
32050 XVV (U)	32310 HX2 (7)
32060 R8D (S)	32320 CD9 (M)
32070 HLQ (A)	32330 362 (E)
32080 WUF (C)	32340 UKN (7)
32090 5MV (L)	32350 WDR (L)
32100 4WR (T)	32360 E7H (4)
32110 4XV (Q)	32370 GJL (T)
32120 XDN (2)	32380 YNF (W)
32130 5OV (G)	32390 ONY (3)
32140 AY9 (V)	32400 YSN (N)
32150 MWK (M)	32410 O3V (9)
32160 D1F (N)	32420 R16 (L)
32170 MC8 (5)	32430 73T (G)
32180 5EC (U)	32440 UTO (4)
32190 W7X (5)	32450 HP7 (T)
32200 8GL (8)	32460 QRR (G)
32210 8EH (3)	32470 3HT (7)
32220 EUL (C)	32480 YHS (7)
32230 WTF (C)	32490 8P8 (5)
32240 MK3 (A)	32500 7YX (Q)

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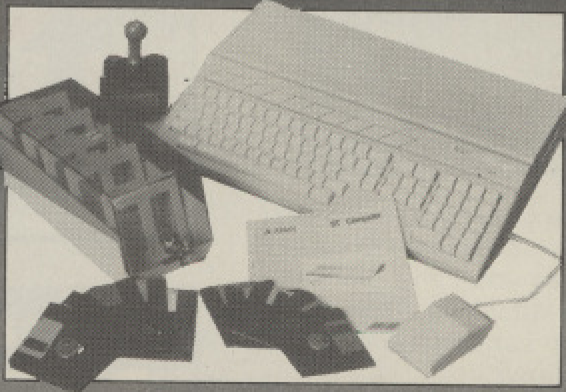
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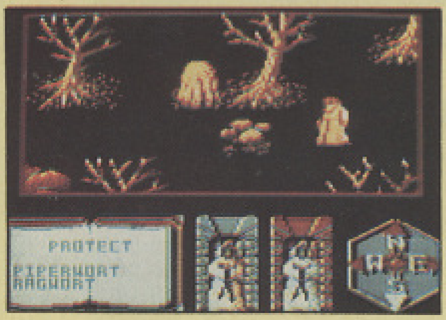
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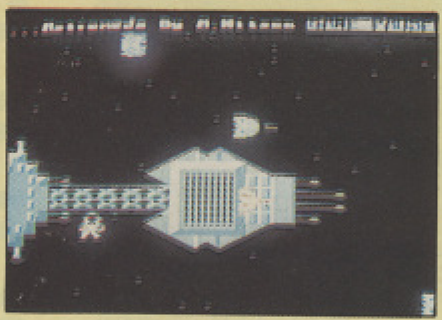
TO complete the game you must first go to the herb garden and try to collect as many herbs as you can before the gardener comes after you. Then leave as fast as you can because your brother soon follows.

Now go to the cauldron and mix the spells that are complete so you can use them against your brother. – **William Gladwin, Doncaster, South Yorks.**

Jet Boot Jack

WHILE playing this superb game from the English Software Company, if you are going across the slides and up the lifts push your joystick up then they will move faster. Also play on the practice game as no monsters will appear to get in your way and annoy you. – **Christopher Hussey, High Wycombe, Bucks.**

Astromeda



THERE is a undocumented feature of the game. If you stop your craft on top of the flashing area then your fuel will increase. – **Kevin Campbell, West Lothian.**

Atari Tennis

WHEN you are serving from the top of the screen in the one-player game, always serve using a forehand as the opponent will have no chance of returning it. – **Dinesh Bhudia, Harlesdon, London.**

Alternate Reality

THERE are two healers and they work on alternate hours so, if a healer is out when you arrive, wait until the next hour and try again. It isn't worth fighting the brown mould as it only usually leaves you with a disease.

There is nothing special about the clubs that you join, except that their prices are sky high. The small green dragons and wraiths can be tricked, so you don't need to fight them.

After using the healer his prices will increase, so exit and walk back in again. – **Granville Danby, Leeds.**

Los Angeles Swat

ONCE you have fought your way to the crossroads you must fight off about four sqauds of men. When the boss and the hostage appear, let them move on to the road. When they are coming from the right, just before the boss gets into your line of fire, shoot and if you time it right and are very accurate, with luck you will kill him and miss the hostage. – **Nigel Bowley, Hockley, Essex.**

Pole Position



WHEN you start, keep the pause button pressed and this way your finishing time will be around 45 seconds. – **Nicholas Atkins, Birstall, Leicester.**

Scrolls of Abadon

PLUG a joystick into port two, type POW and after the game has started you can then move the creatures. To change men press fire – **David Baxter, Franny, Runcorn.**

Krazy Kopter

HOVER above the platform on the right hand side of the screen. This will protect you from being shot by the boat below. If you are very accurate with your bombs you can get extra points by hitting the missile when it appears. – **Nigel Bowley, Hockley, Essex.**

Mercenary 2 – The Second City

HERE is a tip for getting into the programmer's special cheat rooms. When you start, board the Dominion Dart and fly to a height of over 350 metres then level out. Press 9 and then keep > pressed until you reach a speed of around 1781 kph.

Fire a bullet and as you fly close to it pick it up by pressing T. Then fly back to location 08-08 and pick up the object that you started the game inside.

At this point fly to any elevator – the one at location 08-01 is probably the easiest one to get to.

Go underground and walk to the triangular door. You don't get the usual "locked" reply, and you can walk straight in.

You now have the key to every door and you can get into any hanger, out of prison and amass millions of credits easily. It will also be easy to find the Novadrive and the intergalactic starship and escape.

Final quick tip: In one of the complexes out in the wasteland is a room that is bright white inside. If you walk around the room and along the walls, after a while you will find the bar chart from the exchequers. – **Paul Mylet, Woking, Surrey.**

Something old, something new . . .

NEIL FAWCETT takes a look at Atari's latest baby



IN nice time for Christmas, here's something new from Atari – the XE Games System. With its low price, it will be at the top of lots of present lists, so let's take a look at how it performs.

This month we'll assess the new hardware, next month we'll delve deeper and reveal how it compares with the rest of the 8 bit range.

The first thing that hit me was the machine's new external design. Atari has put a lot of thought into this and it has paid off. The XE is very pleasing to the eye.

Although there has been little change in the technical specification, both the overall design of the main board and the layout have changed.

Atari is selling the XE games console in several forms (see panel on facing page). The three systems range from one that is only suitable for games up to one that can be used for any micro application and will even suit serious programmers.

We'll take a look at the individual components so you can best choose which system is for you:

The Game console

This is the heart of the system, and a rectangular case houses what I class as the best 8 bit technology on the market. There is a serial port on the rear, two joystick ports, and sockets for cartridge, keyboard and mains. The DIN audio/video output socket found on earlier machines is replaced by two phono sockets.

The parallel bus that featured on all XL micros has gone, and so has the expansion bus that appeared on the 130XE. The cartridge socket, power switch, Option, Start and Select switches are located on the top of the casing making them easy to access. The switches are coloured in pastel shades and add to the micro's overall looks.

There's an extra bonus built into the console in the form of the old Atari Missile Command game, a classic in its time. The console also has a built-in diagnostic test routine that will check the ram, rom, audio channels, screen display and keyboard switches.

The console comes with 65,536 bytes of ram available to the user and an operating system of around 28k. Contained within the OS is Basic, the game and a self test routine – not bad for a so-called games machine.

Keyboard

A standard qwerty keyboard is supplied, with the control graphics printed on the front of the keys as with the 130XE – this is designed to

save you time constantly referring to manuals.

The keyboard has a lovely feel to it and I found typing at speed very easy. Included is a Help key, usually found with Start and Option on the 8-bit Ataris.

It is detachable, so you can type in whatever position you find comfortable. This adds a very professional feel to the system.

If you POKE 756,204 you will be able to get an international character set if you use the control key in conjunction with key entries.

XC12 Tape recorder

Atari tape units have, with the exception of the very first 410 recorder, been badly designed. The XC12 is a vast improvement in a variety of ways.

The power supply is now taken from the serial lead, and most of the unit is of metal construction and so should last longer than the plastic keys and inserts on the older decks.

The unit complements the system nicely, and will also match the 130XE. When I plugged the tape deck into the back of my disc drive I had trouble loading tapes but when plugged directly into the console it performed perfectly.

Light gun

The gun looks as though it has come straight out of a sci-fi movie and so should appeal to kids of all ages. On a disc in the reviews package was a shoot-'em-up game that uses the gun to plink at bugs on the screen and it worked fine at a fairly long range.

At the moment there is doesn't seem to be any commercial software to take advantage of the gun. However, it is easy to write your own because it works like a light pen.

To get you started here is a short program to demonstrate the techniques used in reading the information sent from the gun to the micro:

```
10 POKE 752,1:REM TURN OFF CURSOR
20 X=PEEK(564):Y=PEEK(565):REM READ X
AND Y COORDINATES OF GUN
30 PRINT CHR$(125):PRINT "X=";X,"Y=";Y
:REM PRINT VALUES RETURNED
40 IF STICK(0)=15 THEN SOUND 1,64,6,11
:REM MAKE NOISE IF TRIGGER PRESSED
50 IF STICK(0)=14 THEN SOUND 1,0,0,0:R
EM SWITCH OFF NOISE IF NOT PRESSED
60 GOTO 20:REM REPEAT THE PROCESS
```

Joystick

The joystick supplied is a standard Atari design that dates back to VCS days. While not being the best unit available it does its job and is fairly sturdy.

When the system is powered up you are presented with the instantly recognisable blue screen with the message READY – Atari Basic is built into the console. This means that all the listings from *Atari User* will work fine. The loading and saving procedures for tape are the same as for the XL/XE micro.

The system was fully compatible with all the commercial software packages I tried on it – and these ranged from Mini Office II to International Karate. All the electronic add-ons tried also worked on the system, including an 850 Interface box, Epson FX80 and Atari 1029 printers.

The system will also support a disc drive – my old 810 and my new 1050 drives worked perfectly when loading games or Dos. Atari is bringing out a new disc drive, the XF-551 and hopefully its design will match the new console to give a very nice looking system.

The console is controlled by a 6502 CPU and has the GTIA custom graphics chip and the POKEY custom sound chip, both being custom chips dedicated to the Atari range.

When these are combined you have at your fingertips some of the best 8 bit electronics to come off the drawing board in the last decade. The computer still has the 6520 PIA chip, and so interfacing techniques are the same.

Programmers have available to them a palette of 256 colours and with a minimum of effort all can be displayed at once. There are 11 graphics and five text modes on offer.

The graphic capabilities are superb and spectacular visual efects can be created using the DLI – Display List Interrupt.

The POKEY sound chip allows you to control four channels independently, with a frequency control ranging from .06Hz to 800Hz – so any sound effects created are quite stunning.

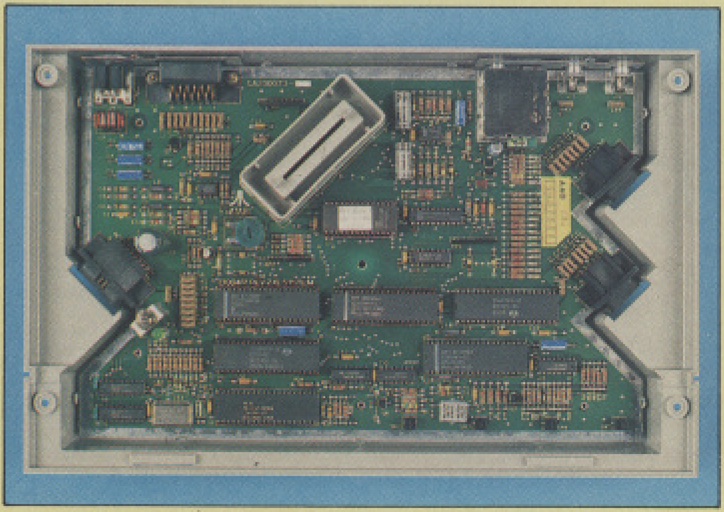
Conclusions

The new design is superb, very sleek and smooth. Picture quality via the TV output has been improved, giving a display that has lost the tendency to drift out of sync.

Including disc software well over 2000 pieces of software will work on the new systems.

- XE Computer Games Console: *Includes 65XE, built-in Missile Command and joystick. £79.95.*
- XE Computer Games System: *Includes 65XE, keyboard, light gun, built-in Missile Command and joystick, flight Simulator II and Bug Hunt games. £119.99.*
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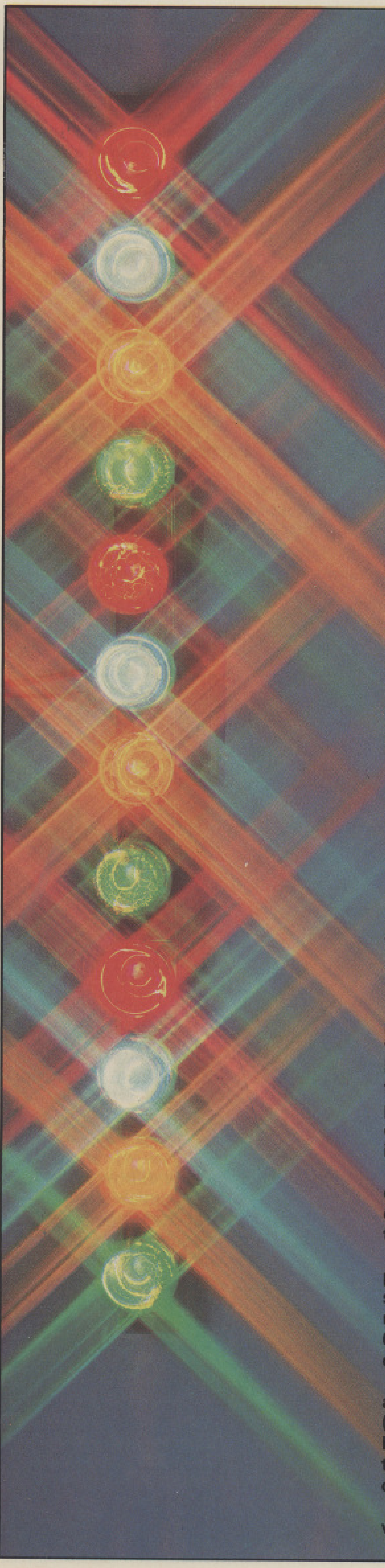
Heart of the new machine



His appetite whetted by our evaluation, next month technical editor André Willey will take a detailed look at the fascinating technology behind the launch of the new machine.

He will also assess how it compares with the rest of the 8 bit range and come to his own conclusions as to its future in the market.

It's the Atari disco show!



LEN GOLDING shows how to brighten up the festive season

OUR offering for the party season is a programmable mains disco light controller. It can generate strobes, chasers, random flashes, pre-set sequences and many other instant atmosphere effects which cannot be matched by units available in the shops.

You can even set up your own son-et-lumière displays, switching from one lighting pattern to the next by a single touch on the keyboard.

Each channel can handle up to six 60 watt coloured reflector bulbs, so it's powerful enough for most clubs and school rooms, as well as for any home. And the design uses a special triggering system which eliminates radio interference, so you can use it alongside your VHF tuner – unlike some commercial units.

Figure I shows the circuit. It's rather more complex than might at first seem necessary, but this is because of the need to protect your micro from stray mains voltages, and to minimise RF interference.

If you're into electronics you will probably see how most of it works without much difficulty. IC1 is used to buffer and amplify the tiny currents from the joystick port, making them powerful enough to drive four light-emitting diodes in a quad opto-isolator.

Your micro can see only this section of the circuit – so far as it is concerned, all the high-voltage switching takes place in another universe.

To preserve the isolation, we've powered the rest of the circuit from a small mains transformer (T1). This must be a centre-tapped type, with 6-0-6 volt outputs, capable of delivering at least 50mA.

The outputs from the opto-isolator are fed to the inputs of a four-bit latch (IC3). If pins 4 and 13 of this IC are high, the input pattern is transferred to the four outputs, otherwise changes at the inputs have no effect.

TR1 monitors the mains AC voltage, which swings from positive to negative voltage and back again 50 times a second, passing through zero volts on each swing. When the downward cycle reaches about 0.6V, the collector of TR1 goes high.

This triggers a monostable made from IC2a and IC2b. Its output goes high for a few microseconds, unlatching IC3 and allowing the input pattern to flow through to the outputs. When the monostable output returns to its low state, IC3 becomes latched, so the outputs remain in their current pattern until the next zero-volt transition.

The combined action of TR1, IC2 and IC3 ensures that the disco lamps cannot switch on or off unless there is practically no voltage across them. This eliminates power surges and consequent RF interference. It also avoids the need for bulky and expensive suppression chokes and capacitors.

IC4 buffers the output signals from

WARNING!
Once the mains supply is connected to the board, triac heat sinks and several other on-board components will become live and must not be touched!

high, current can flow – when it is low, current is blocked.

Now on to the construction side of the article. The printed circuit board is available as always from RH Design, who can also supply a ready-built and tested module, for you to connect up to the mains and mount in a suitable case.

Those of you who prefer to etch your own PCBs can use the pattern shown in Figure II. All holes are 1mm, except the mounting holes for the

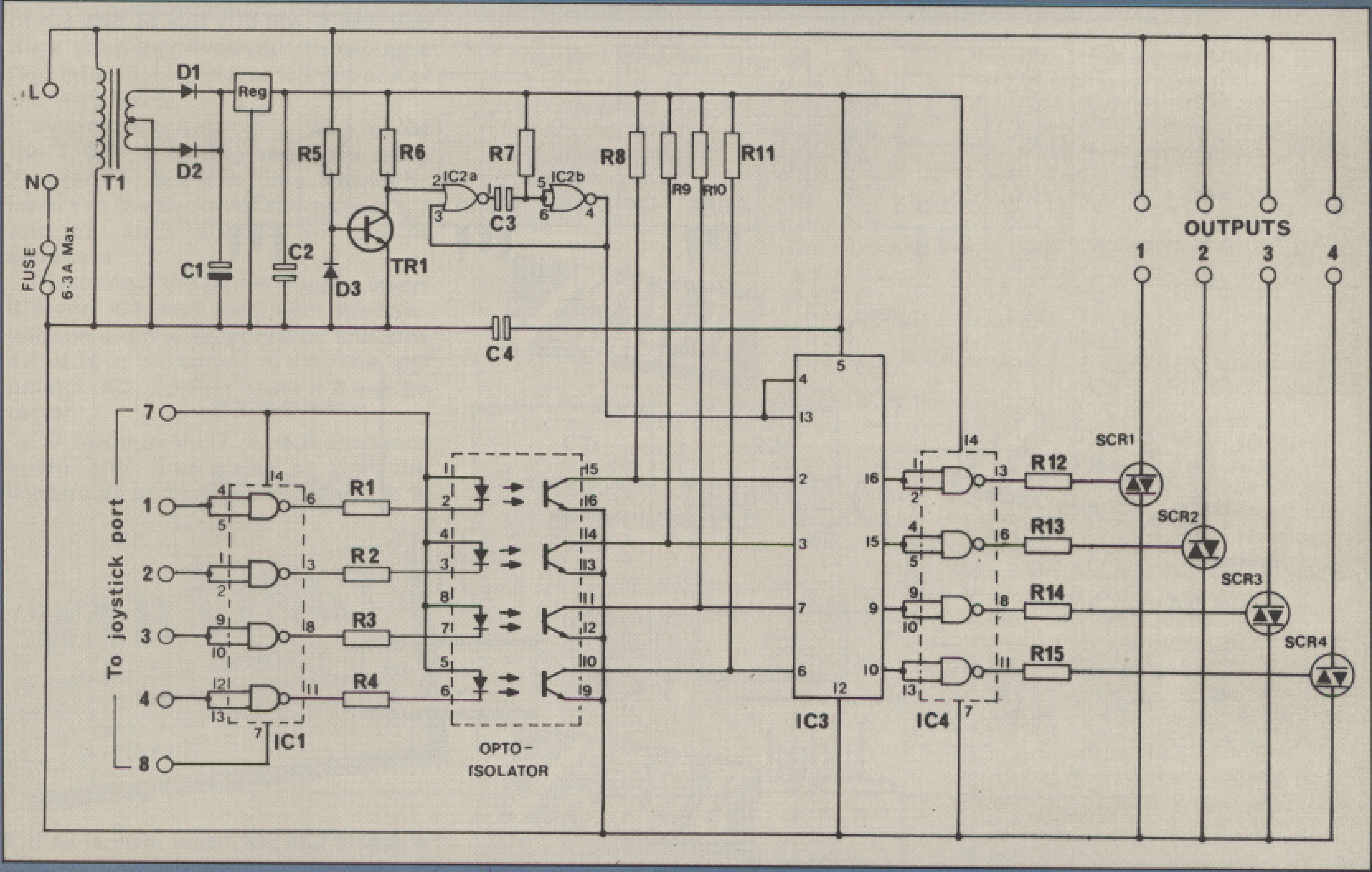


Figure I: The circuit

triacs and the PCB itself (3mm), the fuse clips (1.5mm) and the terminal blocks (1.2mm).

Figure III shows the component layout. Start by fitting the resistors and wire links – they can go either way round. Then fit the three diodes, observing correct polarity as marked by the band at one end. Solder the IC sockets, followed by the voltage regulator, again taking care that this goes the right way round.

Although Figure III shows a fuse on-board, you may prefer to run leads from the pads to a chassis-mounting fuseholder, so that you can change the fuse without dismantling the case. Maplin's type RX96E is suitable.

If you do this, it's easiest to use 1 sq mm solid-conductor mains cable – the kind sometimes used for domestic lighting circuits. You will need to take very great care soldering the wires to the tracks, as any stray blobs of solder could be disastrous. In either case, the fuse should be not more than 6.3 amp rating.

All other connections to and from the board are taken through PCB terminal blocks, which are much easier to solder and safer to use. Solder them in place, then fit C1, C2, C3 and C4, making sure that C1 is the right way round – the negative side is

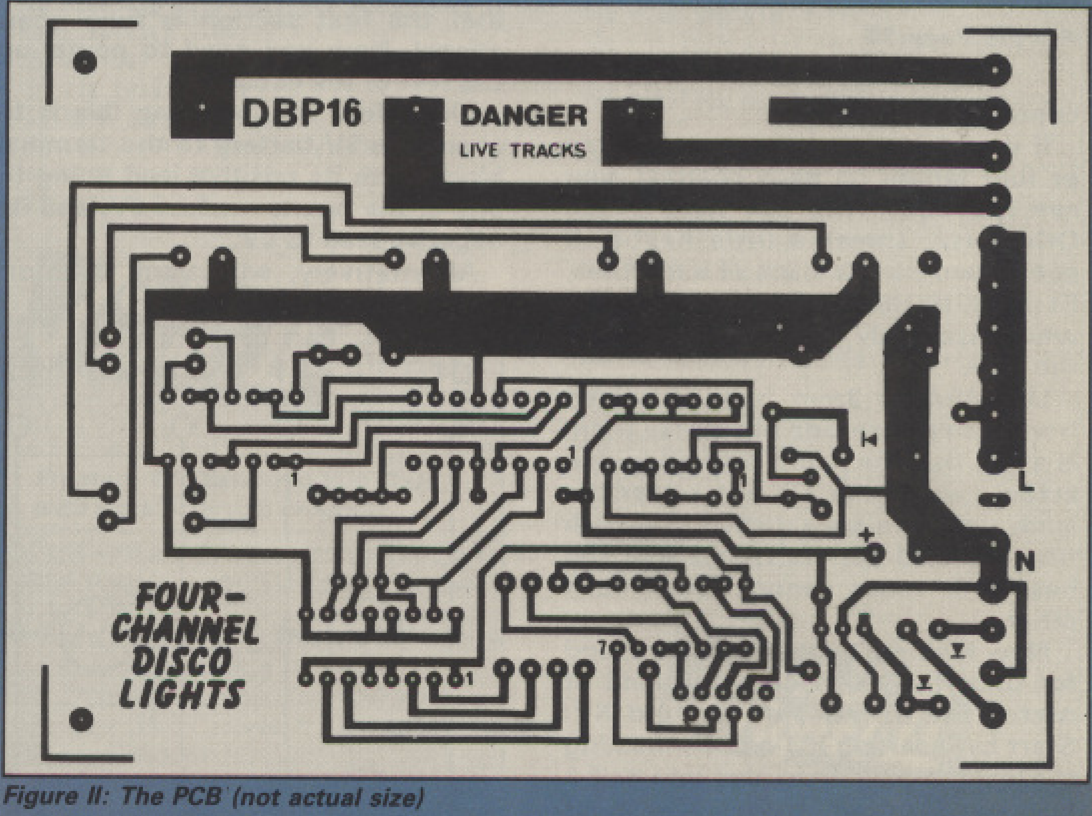


Figure II: The PCB (not actual size)

marked with a broad band containing chevrons and the number 0. Next fit TR1 and the 9-pin D connector which will accept the joystick extension cable.

Finally, fit the triacs. Snip off the centre lead from each, and bend the remaining ones at right-angles to fit the PCB holes. If your PCB is not roller-tinned, scrape away the etch-resist coating under each triac fixing hole, so that the bolt can make good

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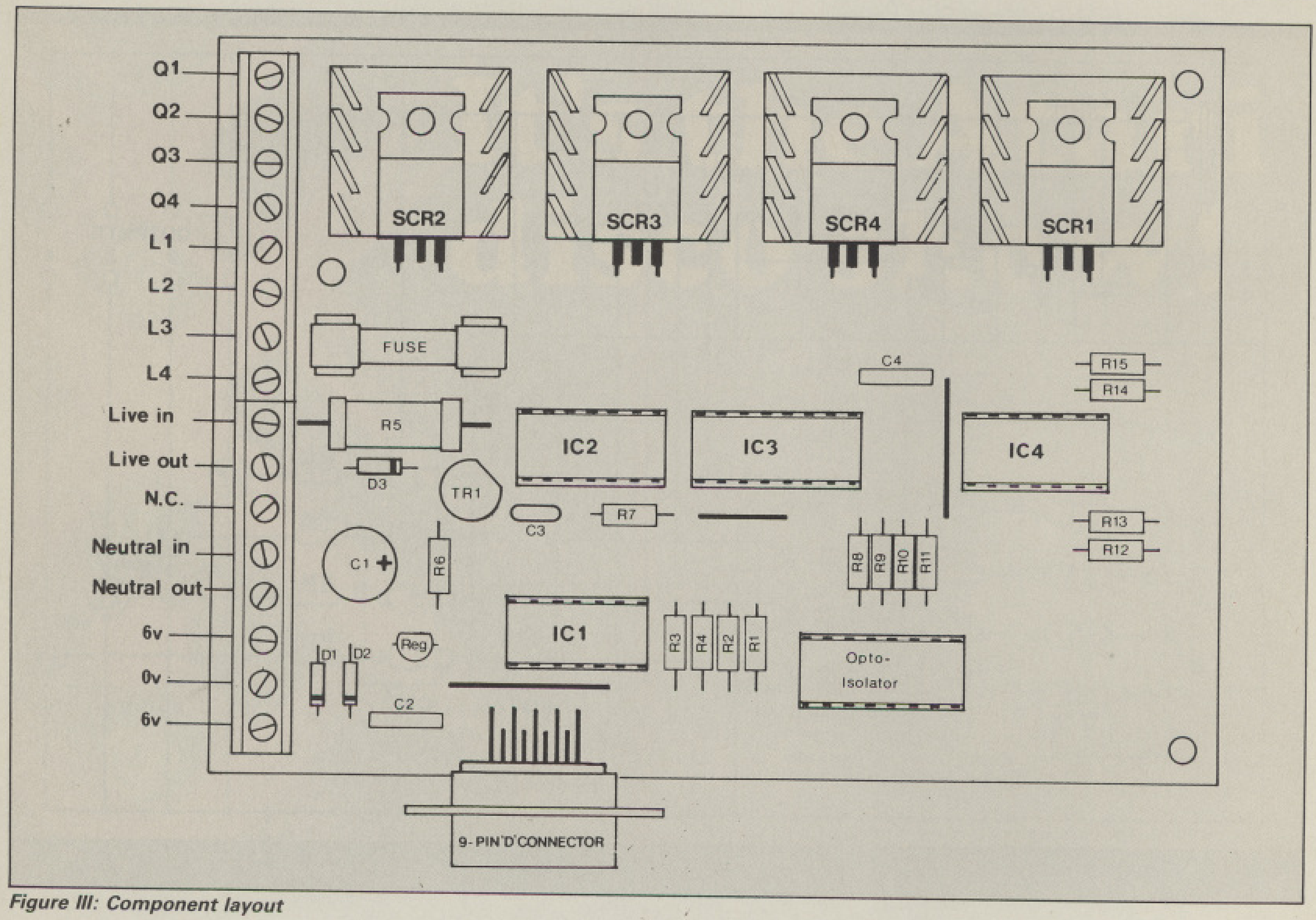


Figure III: Component layout

◀ ***From Page 35***

contact with the track.

If you're planning to run only three or four lamps on each channel, you can dispense with the heat sinks. Otherwise, smear a little heat-sink compound on the back of each triac, fit it to its heat sink and bolt the whole assembly tightly into place on the PCB.

Use 6BA or 3mm bolts, inserted from the reverse side otherwise there is a risk that the fixing nut will bridge across two tracks. Do not solder the leads until you are satisfied that each triac is fitted correctly, and that the heat sink vanes cannot touch each other.

Now it's time to test the board, and for this you will need some kind of meter set to measure around 5V. Start by inserting IC1 and connecting the joystick lead, then plug into port 1 and run Program I. Check each of IC1's outputs – pins 6, 3, 8 and 11 – they should all be high (about +5V).

Now type 1 and hit Return. Pin 6 should fall low (0V), while the other three outputs remain high. The same should occur for pins 3, 8 and 11 when you type 2,4 and 8 respectively. If these tests work correctly, it means that the first section is fully operational. Now you need to power-up the rest of the circuit.

The safest way of doing this is to connect a 9V battery to the terminal block, with its positive lead going to one of the points marked 6V, and its negative lead to 0V.

Alternatively, wire your transformer to the mains via an external terminal block, and fit the secondaries to the PCB. The specified transformer has three secondary wires. Fit the two same-coloured ones to the 6V points – it doesn't matter which way round they go – and the different one to 0V.

Check that 5v appears at each IC

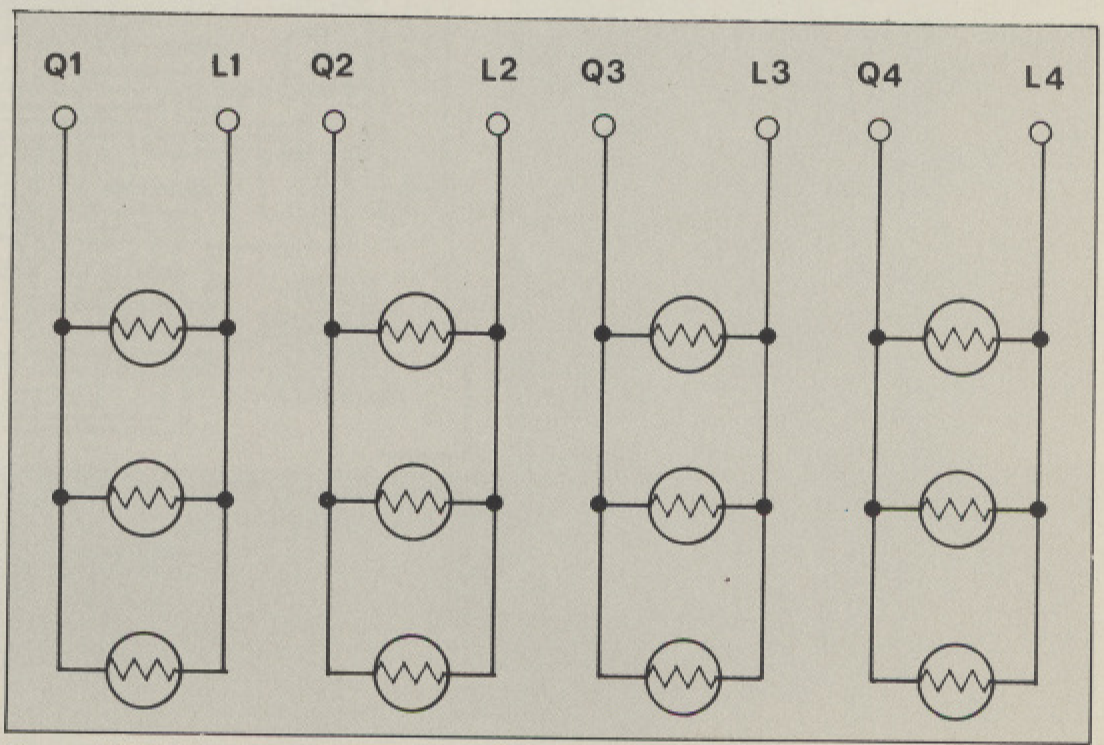


Figure IV: Bulb layout

socket – pins 14 and 7 of IC2, 5 and 12 of IC3 and 14 and 7 of IC4. If not, you have probably inserted the voltage regulator incorrectly, or left out one of the wire links.

Insert the opto-isolator and repeat the 1, 2, 4, 8 testing sequence using Program 1, but this time check the inputs at the socket of IC4 (pins 2, 3, 7 and 6). They should go low in sequence.

Disconnect the power supply, insert IC3 and IC4, and reconnect the low-voltage supply. Temporarily link pins 4 and 14 at the socket of IC2: This will unlatch IC3, so that section 3 can be tested.

Go through the 1, 2, 4, 8 sequence again, this time checking that the triac gates go high in the order 1, 2, 3, 4. If all is well, insert IC2 and attach a 60W or 100W mains lamp to each of the triac outputs, as shown in Figure III.

WARNING!

Remember that potentially lethal mains voltages are involved, so great care is needed in construction and testing!

That's all that can be done without connecting the mains, but if everything is satisfactory so far there should be no further problems.

It's best to mount the board in some sort of case or enclosure – a cardboard box will do – to reduce the risk of touching live components while you're testing. And remember to unplug the unit from the mains before touching the board.

If everything has been wired correctly, the mains lamps should light in sequence when you type 1, 2, 4 and 8. You may like to wire a panel neon in parallel with each output, to act as a monitoring device. These can be wired to the eight-terminal block along with the lamp leads.

You will almost certainly want to design your own display, so there's little point in giving constructional details here. The prototype batten was made from square-section plastic drainpipe, which is very cheap and available from many builders merchants or DIY stores.

You might prefer to make up a number of smaller battens, say with four lamps each, so that they can be distributed around a large room. Whatever method you choose, all the lamps for each channel should be

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Program I: Basic test program

```
5 REM PROGRAM 1: TEST DISCO LIGHT UNIT
10 POKE 54018,56:POKE 54016,255:POKE 5
4018,60:POKE 54016,0
20 INPUT N
30 POKE 54016,N
40 GOTO 20
```

Get it right! II

```
 5 CAN (S)
10 CRP (Y)
20 PFF (8)
30 S8V (4)
40 KKK (9)
```

Program II: Basic strobe program

```
5 REM PROGRAM 2: SINGLE CHANNEL STROBE
10 POKE 54018,56:POKE 54016,255:POKE 5
4018,60:POKE 54016,0
20 POKE 54016,1:REM SWITCH CHANNEL 1 O
N
30 FOR W=1 TO 10:NEXT W:REM "ON" TIME
40 POKE 54016,0:REM SWITCH ALL CHANNEL
S OFF
50 FOR W=1 TO 50:NEXT W:REM "OFF" TIME
60 GOTO 20
```

Get it right! II

```
 5 CAN (S)
10 CRP (Y)
20 1YE (C)
30 MKF (4)
40 1YC (K)
50 MLO (C)
60 KKM (4)
```

Program III: Basic chaser program

```
5 REM PROGRAM 3: FOUR-CHANNEL CHASER
10 POKE 54018,56:POKE 54016,255:POKE 5
4018,60:POKE 54016,0
20 RESTORE 70
30 FOR CHAN=1 TO 4
40 READ D:POKE 54016,D
50 FOR W=1 TO 100:NEXT W:REM SET SPEED
60 NEXT CHAN:GOTO 20
70 DATA 1,2,4,8
```

Get it right! II

```
 5 CAN (S)
10 CRP (Y)
20 SYT (C)
30 3CY (U)
40 98P (D)
50 R8D (2)
60 6U4 (E)
70 QKV (W)
```

Program IV: Basic random flash with equal intervals program

```
5 REM PROGRAM 4 - FLASHES LIGHTS IN RA
NDOM COMBINATIONS, WITH EQUAL INTERVAL
S BETWEEN CHANGES
10 POKE 54018,56:POKE 54016,255:POKE 5
4018,60:POKE 54016,0
20 SPEED=100:REM Controls the rate of
change (333 is approx 1 second)
30 N=INT(RND(0)*15)+1
40 POKE 54016,N
50 FOR W=0 TO SPEED:NEXT W:GOTO 30
```

Get it right! II

```
 5 CAN (S)
10 CRP (Y)
20 SAQ (F)
30 ACD (K)
40 S8W (S)
50 34H (R)
```

Program V: Basic flash with random interval program

```
5 REM Program 5 - FLASHES LIGHTS IN RA
NDOM COMBINATIONS, WITH RANDOM INTERVA
LS BETWEEN CHANGES
10 POKE 54018,56:POKE 54016,255:POKE 5
4018,60:POKE 54016,0
40 N=INT(RND(0)*15)+1:REM Select Rando
m pattern
50 SPEED=INT(RND(0)*200):REM Select ra
ndom delay
60 POKE 54016,N
70 FOR W=0 TO SPEED:NEXT W:GOTO 40
```

Get it right! II

```
 5 CAN (S)
10 CRP (Y)
40 C8G (P)
50 S5T (7)
60 S8Y (F)
70 34L (A)
```

Program VI: Basic program to control flash from keyboard

```
10 REM Program 6 - Keyboard controlled
 sequencer. Press '*' to advance, '+'
 to go back or ESC to start again
20 X=0:REM Load the DATA into Page 6
30 READ D:IF D=-1 THEN 60
40 POKE 1536+X,D:X=X+1:IF X>255 THEN ?
 "TOO MUCH DATA":END
50 GOTO 30
60 MAX=X-1
70 POKE 54018,56:POKE 54016,255:POKE 5
4018,60:POKE 54016,0
80 GRAPHICS 2
90 X=0
100 N=PEEK(1536+X)
110 POKE 54016,N
120 POSITION 0,2:? #6;"CONTROL NUMBER:
 ";N;"  "
130 POSITION 0,5:? #6;"SEQUENCE NUMBER
: ";X;"  "
140 IF X=MAX THEN POSITION 0,7:? #6;"(
LAST ONE)"
150 IF X<MAX THEN POSITION 0,7:? #6;"
            ":REM 12 SPACES
160 IF PEEK(764)=255 THEN 160
170 IF PEEK(764)=7 THEN X=X+1*(X<MAX):
GOTO 200
180 IF PEEK(764)=6 THEN X=X-1*(X>0):GO
TO 200
190 IF PEEK(764)=28 THEN X=0
200 POKE 764,255:GOTO 100
210 REM Each DATA item represents a pa
rticular combination of channels. Up t
o 255 may be programmed
220 DATA 0,1,5,3,12,7,2,14,4,15,0,-1
```

Get it right! II

```
10 CP1 (Y)    90 D49 (D)   160 LDE (N)
20 DKL (E)   100 ODP (G)   170 UA7 (C)
30 9FT (1)   110 SDC (9)   180 K4J (N)
40 RJG (V)   120 YPN (7)   190 TS5 (3)
50 KKM (J)   130 252 (A)   200 CXD (5)
60 KQQ (S)   140 Q6K (W)   210 CYT (8)
70 CRV (S)   150 VHX (K)   220 TAU (C)
80 UWS (V)
```

Number in 54016	PORT 1 Chan.1	Chan.2	Chan.3	Chan.4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

Table I: Output switching

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wired in parallel, as shown in Figure IV.

The lighting effects available are very easily programmed, and we have listed a few ideas to get you started. Table I shows the numbers which must be POKEd into address 54016 to switch on any given combination of channels.

Program II is a simple strobe, acting on one channel and Program III is a four-channel chaser. Program IV flashes lights randomly at a constant rate, while Program V flashes them randomly at random rate. Program VI shows how you can generate a pre-programmed pattern sequence.

The unit can handle 500 watts per channel so long as the load is switched on and off every couple of seconds, and no more than two channels are on at the same time. If the on period is likely to be longer than this, or all channels will be on simultaneously – however briefly – it's best to keep the total power drain to about 300 watts per channel.

	PORT 1				PORT 2			
Pin number	1	2	3	4	1	2	3	4
Control Number	1	2	4	8	16	32	64	128

Table II: Switch control numbers

PARTS REQUIRED FOR 4-CHANNEL DISCO LIGHTS CONTROLLER

		Maplin Code
R1-R4	820 ohm (4 off)	M820R
R5	100K 1 Watt	C100K
R6	10k	M10K
R7	100K	M100K
R8-R11	4K7 (4 off)	M4K7
R12-R15	620 ohm (4 off)	M620R
C1	470 mfd 25v	FF16S
C2	0.1mfd miniature disc	YR75S
C3	1000 pf (1nf) ceramic	WX68Y
C4	0.01 mfd miniature disc	YR73Q
IC1, IC4	74AC00 (2 off)	UH67X
IC2	74HC02	UB01B
IC3	74LS75	YF32K
D1-D3	1N4004 (3 off)	QL76H
TR1	BC117	QB34M
SCR1-SCR4	C206D Triacs (4 off)	WQ24B
T1	6-0-6v transformer	WBOOA
	Quad opto-isolator	YY63T
	75L05AWC +5v regulator	QL26D
	14-pin DIL sockets (3 off)	BL18U
	16-pin DIL sockets (2 off)	BL19V
	Right-angle 9-pin D socket	FG25C

		Maplin Code
	8-way PCB block (2 off)	RK38R
	Fuse clips (2 off) *	WH49D
	6.3A anti-surge fuse	RA13P
	Vaned heat sink (4 off) *	FL58N
1 pack	6BA x ¼" RH bolts	BFO5R
1 pack	6BA nuts	BF18U
	Silicon grease *	HQ00A

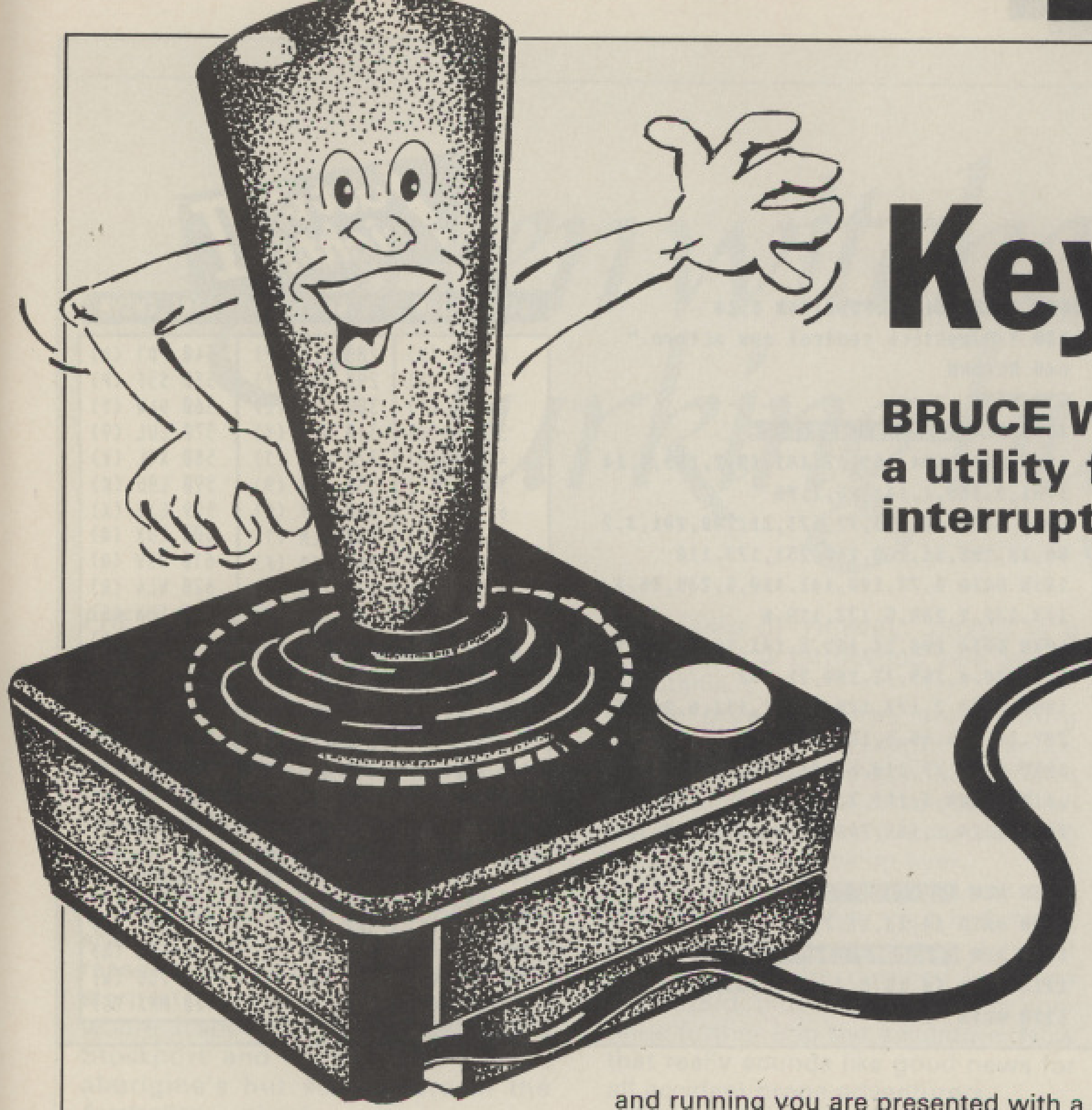
All the above components are available from:

Maplin Electronic Supplies, P.O. Box 3, Rayleigh, Essex SS6 8LR. Tel: 0702 552911

The printed circuit board (order code DBP16) at £4.88 and joystick extension lead (order code AT111) at £2.99 are available from:

R.H. Design, 137 Stonefall Avenue, Harrogate, North Yorkshire, HG2 7NS. Tel: 0423 508359

** These components may not be needed – see text*



Keystick

BRUCE WOODLAND provides a utility for a programmable interrupt driven joystick

WHEN you write programs it is often necessary to provide both cursor key and joystick options to widen their user appeal. If the micro could be fooled into interpreting a joystick input as a predesignated keypress the user would have the best of both worlds and you'd have less programming to do.

This utility allows you to ignore joysticks as you write your program, but still make use of them in the final product. To do this, first type in the listing, remembering to use Get it Right II! and save a copy to disc or tape.

When the routine is run it will set up an interrupt driven machine code program residing in page 6. This new routine will constantly scan joystick port 1 and interpret all joystick movements as key inputs.

It accomplishes this by sampling input from the port, translating it into the required internal key code and writing this information to the keyboard register at regular intervals.

This sampling rate is normally matched to the keyboard auto-repeat, but if the fire button is pressed the time delay between the sampling is shortened. The routine has two modes of operation and you can toggle between them by pressing Option.

When the program is in memory and running you are presented with a menu of keyboard inputs against joystick movements. At this point you are asked if you wish to accept the values as they are, or to enter new values.

The program will offer you all eight joystick movements and you enter the corresponding keyboard functions. The fire button is always linked to the spacebar.

At this time you are in the first of the two modes and this ties the Control key to all inputs from the joystick, allowing you on-screen editing features from the joystick.

To indicate that you are in the editing mode a flashing cursor is present and if the fire button is pressed the cursor will whizz around the screen. The second mode is without the link to Control and you simply get standard keyboard entry.

The machine code routine is not directly relocatable since a definite address must be inserted as a vector and the keyboard addressed by direct indexing methods. This means the routine is disabled by pressing Reset, but it can be re-implemented by:

```
CALL=USR(1536)
```

If you find this utility useful you may wish to modify it as a non-resettable AUTORUN.SYS file. The routine could then be stored above Dos and below LOMEM leaving page 6 free for other uses.

```
0 REM ┌──────────────────────┐
1 REM |**PROGRAMMABLE  JOYSTICK**|
2 REM | For cursor  editing mode |
3 REM |  --or any 8 key group.   |
4 REM |Written by B.Woodland,1987|
5 REM |      (c)ATARI USER       |
6 REM └──────────────────────┘
8 REM
10 REM *MAIN PROGRAM*
20 GOSUB 100:REM CODE SETUP
30 GOSUB 300:REM USER PARAMS
40 GOSUB 600:REM ENABLE JOYSTICK
50 NEW
60 REM
100 REM *Machine Code Setup*
110 DIM KCODE(8)
120 ? CHR$(125):? :? "Please wait..."
130 OPEN #1,4,0,"K":CV=0:A=0:ADD=1536
140 READ DTA
150 IF DTA<1 THEN 180
160 POKE ADD+A,DTA:A=A+1
170 CV=CV+DTA:GOTO 140
180 RESTORE 1100
190 FOR LOOP=0 TO 7:READ DTA
200 KCODE(LOOP)=DTA:NEXT LOOP
270 IF CV=11654 THEN RETURN
280 ? "Data Error.....Recheck!":END
290 REM
300 REM *Get User Designated Keys*
310 ? CHR$(125):POSITION 13,0
320 ? "KEYCODES":? :?
330 ? "Present key asignment:-":?
340 ? "          1  2  3  4  5  6  7  8"
350 ? "Jstick Up Dn Lt Rt Lu Ru Ld Rd"
:?
360 ? "Mode 1 Ɛ↑  Ɛ↓  Ɛ←  Ɛ→  ┌  ┬  ├
┼":?
370 ? "Mode 2 -  =  +  *  Q  W  A  S":
?
380 POSITION 2,14
390 ? "Change Assignment?":GET #1,K
400 IF K=ASC("N") THEN RETURN
```

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```
410 REM Get Users Keycodes
420 FOR KEY=0 TO 7:POSITION 2,15
430 PRINT "Key ";KEY+1;:GET #1,K
440 KCODE(KEY)=PEEK(754)
450 POSITION 6+(KEY+1)*3,12
460 ? CHR$(K):NEXT KEY:POSITION 2,16
470 REM Check For Edit Validity
480 RESTORE 1100:LOOP=0
490 READ DTA
500 IF DTA<>KCODE(LOOP) THEN 530
510 LOOP=LOOP+1:IF LOOP<4 THEN 490
520 GOTO 540
530 ? "NOT SUITABLE FOR MODE 1!"
540 ? "OK? (Y/N)";:GET #1,KEY
550 IF KEY<>ASC("Y") THEN 300
560 REM Users Keycodes To RAM
570 A=A-8:FOR LOOP=0 TO 7
580 POKE ADD+A+LOOP,KCODE(LOOP)
590 NEXT LOOP:RETURN
599 REM
600 REM *Enable Joystick Routine*
610 CALL=USR(ADD)
620 ? CHR$(125):POSITION 6,10
630 ? "Joystick control now active."
640 RETURN
690 REM
1000 REM Machine Code Data
1010 DATA 104,169,17,141,40,2,169,6,14
1,41,2,169,1,141,26,2,96
1020 DATA 72,138,72,173,31,208,201,3,2
08,13,205,31,208,240,251,173,110
1030 DATA 6,73,128,141,110,6,238,26,2,
173,132,2,208,5,173,110,6
1040 DATA 208,14,169,6,141,26,2,173,13
2,2,208,4,169,33,208,21,162
1050 DATA 7,173,120,2,221,111,6,240,5,
202,16,248,48,9,189,119,6
1060 DATA 77,110,6,141,252,2,169,2,174
,110,6,240,5,169,3,77,243
1070 DATA 2,141,243,2,104,170,104,96,1
28
1080 REM Joystick Codes Table
1090 DATA 14,13,11,7,10,6,9,5
1100 REM Keyboard Codes Table
1110 DATA 14,15,6,7,47,46,63,62
1120 DATA -1
```

Get it right! II

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
0	CAH (V)	280	RL9 (P)	540	PD1 (D)
1	CAJ (1)	290	DYT (Y)	550	S5F (P)
2	CAK (Y)	300	CUU (L)	560	DLW (Y)
3	CAL (O)	310	N41 (Y)	570	EUL (9)
4	CAM (R)	320	DH8 (1)	580	X4L (X)
5	CAN (1)	330	T8R (9)	590	L9U (K)
6	CAP (U)	340	DYF (N)	599	EJW (X)
8	CAR (G)	350	SLM (1)	600	CUX (Q)
10	CP1 (H)	360	1FD (F)	610	O5V (Q)
20	S2P (L)	370	16J (H)	620	NL4 (R)
30	SAQ (H)	380	Y5L (8)	630	FHX (S)
40	SPR (P)	390	NV4 (T)	640	RPA (M)
50	DCW (M)	400	X55 (L)	690	DYX (S)
60	CP6 (D)	410	CYV (R)	1000	CXN (Y)
100	CUS (2)	420	XMR (P)	1010	W36 (D)
110	WCT (F)	430	T4D (G)	1020	C3N (2)
120	OYW (L)	440	AVH (S)	1030	Y3J (S)
130	1LP (T)	450	SO7 (D)	1040	1QF (4)
140	VK5 (4)	460	6JE (N)	1050	XWN (F)
150	5A5 (9)	470	DQV (W)	1060	12T (S)
160	DP9 (G)	480	J9S (M)	1070	TUD (H)
170	9WG (R)	490	W68 (9)	1080	DFN (M)
180	XEM (X)	500	UEX (L)	1090	EY1 (L)
190	ULR (D)	510	29M (L)	1100	D2N (N)
200	YH5 (J)	520	QWC (7)	1110	FO6 (W)
270	V9U (6)	530	YV1 (H)	1120	MMX (G)

Green witches and lurking bugs

by Rouloc

PHEW! Never thought I was going to make it in time for this month's issue. There I was in Tervania (a small village – turn left just past Outer Mongolia and it's first on the right) surrounded by a thousand slavering orcs. I'd have preferred to have thwacked a couple of hundred or so before I took my leave, but time was pressing.

Unfortunately, my transportation spell came out a bit wonky for some reason I still can't fathom. I said Pockstorp at the place in the incantation where I should I should have said Stockport and found myself in an aborigine's hut somewhere in the Australian outback.

Since then my spell has become a little depleted in power so I had to fly back across the world on a broomstick – old-fashioned and undignified but at least it worked.

Still, it's an ill wind and all that. On the way back, I stopped off for a quick oil change on the broomstick and bumped into my old friend Brillig from *Atari ST User* – he had just popped into the same garage for a rebore job on his wand.

We got chatting and he happened to mention that he'd found a bug in Infocom's The Lurking Horror and thought my readers might also be interested.

If you have the brass hyrax ring, take it into the terminal room where the hacker sits and drop it. Then say "Wear ring" and the program will respond by asking whether you mean the hacker's keyring or the hyrax ring.

If you then indicate that you want the keyring, the program tells you that you can't wear it. But examine your inventory and you'll find you've got it – green keys, yale keys and all the rest. Nice bug, even if it's not much use to you.

Hot news from Rainbird – its next Magnetic Scrolls adventure called Jinxter is well under way and should be available soon – it may even be out by the time you read this.

Featuring the same superb graphics and sophisticated parser as The Pawn and Guild of Thieves, Jinxter is a modern and humorous tale set in Aquitania.

The green witches are gaining power in Aquitania, thanks to the dispersal of the pieces of a lucky charm bracelet. Your task is to retrieve all seven pieces and link them together to stop the witches taking over.

The interesting thing is that you can't get killed while your luck holds out. Instead, if you have a lethal encounter, you're dumped just past the hazard, thus allowing you to continue further into the adventure. Now that really sounds like good news for all accident prone adventurers.

The mailbag has been groaning ever louder of late and I'm afraid that I've a little catching up to do. Don't despair if you don't get a mention or have to wait a while before your name pops up in this column – I get so many letters it is simply not possible to find room to include all of them.

But rest assured that Ruoloc reads every single one of your missives with great interest and admiration – and very grateful he is, too. The thought of getting back to read the latest batch of letters has more than once spurred me to greater efforts to escape from rat-infested dungeons in foreign climes.

My thanks this month go to Adam

Turn to Page 42 ▶



◀ *From Page 41*

Marshall of Penrith in Cumbria for his tips on The Price of Magick and Alternate Reality. I especially liked one of his tips for the latter – he advises that whenever you get the chance, always try to trick giants as they are very thick and very rich!

Paul Clark in Positano was grateful for our map of Worm In Paradise in the August 1987 issue of *Atari User*, but is still having trouble with the Basic listing because using the Eden transport system he keeps getting a Dim error.

I thought the program was correct and that the error must be caused by Paul's typing, but is anyone else having the same problem?

I may have got his first name incomplete, but Ty Hays of Nuneaton was not impressed with the same map – but at least it gave him the incentive to get stuck back into the game.

He does mention one peculiarity of Worm which I haven't yet had time to check out for myself. He says that if you go to the police station, type "give me" then "examine all", the program will list out all the items in the game.

Ty also wonders what race I come from. Well, you've seen my handsome picture printed on the previous page fairly regularly so you should have no trouble in guessing that I am a dwarf of the magical variety.

My feet really are that big – I do a lot of walking on account of my regular faulty recitation of transportation spells – and I have to have all my shoes specially made by the Seven League Boot and Shoe Company.

Speaking of small folk, Level 9 has written an adventure about one of my old flames – a young bossy gnome by the name of Ingrid Bottomlow. The adventure is called Gnome Ranger and it's a corker – watch these pages for a review.

Finally, in the hints and tips, I am pleased to be able to help Andrew Blair of Glasgow with Mordon's Quest, Bob Stacy of Cardiff with The Lurking Horror, Peter Goulden of Lincoln with Arrow Of Death Part II, Mike Proctor of Shrewsbury with The Pawn, and Dean Reynolds of Solihull with Leather Goddesses of Phobos. For these and many other readers, help is always at hand.

I'll try not to get lost next month – I plan to buy a new transportation spell. If I do manage to get here without a hitch, maybe I'll let you have a list of how all the points in The Pawn are awarded. How's that for a treat? Until then, exciting adventuring!

Hints & tips

LEATHER GODDESSES OF PHOBOS

● *Having a tough time in the cage with the gorilla?*

Throw the chocolate into the cage before being strapped down. Once in the cage, eat the chocolate and you'll be strong enough to pull the bars and get out.

● *Sultan's riddle solution eluding you?*

The answer is "riddles".

● *Can't get into the igloo?*

Put the baby in the basket, put the basket on the stoop, hide and wait for the baby to be taken into the orphanage.

● *Coded message a mystery?*

Replace each letter by its third previous one in the alphabet, for example replace E by B and B by Y. Then read the whole message backwards.

THE PAWN

● *Five points adrift?*

Don't forget to ask the Devil "What is the wristband for?"

MORDON'S QUEST

● *Cannibal pygmy a problem?*

Make a blowpipe using the bamboo, thorns and berries and kill the pygmy with it.

Now you've defeated the pygmy, you've got something to feed to the meat-eating plant – gruesome stuff!

THE LURKING HORROR

● *Horrible monster keeps flying off with the hand?*

Drive the creature away by throwing the stone at it inside the dome, go down to the skyscraper roof and do it again.

ARROW OF DEATH Part II

● *Want to go somewhere from the bridge?*

Hold on to the support rope and cut it – then you'll really be swinging! Make sure you've got a soft landing – fluffy leaves?



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5 LINERS



CAPS LOCKS INDICATOR
from Matthew Bernstein

HAVE you ever had problems with the Atari's CAPS key? This five line program provides a cure by giving a visual indication of whether the computer is in uppercase, lowercase or control lock.

The utility places an extra line of text at the top of the screen which will indicate the state of the CAPS lock mode and this is shown in an abbreviated form on screen:

CAPS uppercase
LOWR lowercase
CTRL control lock

The routine is executed by A=USR(1624) and will work in any graphics mode. When you change modes the line will be lost so you must re-call it again with the USR command.

The program contains its own check routine so it will not start the machine code routine if the totals do not match.

This prevents the program from crashing the micro if you make a mistake as you type in the program.

The machine code sets up a VBI (vertical blank interrupt) which will scan location 702 every fiftieth of a second, so the program appears to be working instantly, but it only alters the screen display when the keyboard handler registers are changed.

```
1 DATA 112,70,7,6,1,0,0,0,0,0,35,33,48
,51,0,44,47,35,43,26,35,33,48,51,0,0,0
,104,162,6,160,38,169,7,32,92,228,96
2 DATA 173,190,2,201,128,208,5,162,8,7
6,61,6,201,64,208,5,162,0,76,61,6,162,
4,160,4,189,76,6,153,19,6,232,136,208
3 DATA 246,76,98,228,51,48,33,35,50,55
,47,44,44,50,52,35,174,48,2,232,232,14
2,5,6,174,49,2,142,6,6,162,0,142,48,2
4 T=0:FOR I=1536 TO 1650:READ D:POKE I
,D:T=T+D:NEXT I:IF T<>8413 THEN ? "DAT
A error, please check again.":END
5 I=USR(1624):DATA 162,6,142,49,2,76,2
7,6
```

Get it right! II

```
1 82L (7)
2 DOS (F)
3 CMC (Y)
4 UW1 (E)
5 YND (1)
```

SCROLLING MESSAGE WINDOW
from Eric McGough

HERE is a simple Basic program which you can adapt to suit your own needs. It prints a scrolling message in a window on a Graphics 0 screen. It is just an example to fire your imagination and you could, for example, adapt it to print a number which would rise or fall depending on which way the joystick is moved and is then selected as an input when fire is pressed.

PROGRAM BREAKDOWN

1 Selects Graphics Mode 0 and dimensions A$. The string is then defined. The spaces on either side of the message determine the gap between the blocks of words as they pass through the window. B and C are then set to the portion of the string you wish to display which is a chunk of 10 characters starting at the first in the string in this case. The line ends with a POKE which switches off the cursor, otherwise it will flash when the message is printed.

2 Beginning of the loop to display window. The FOR..NEXT loop is set to 600 to it keep running until the fire button is pressed and going back to the loop causes a slight blip. The window is then positioned where you want it on screen. Next, the required portion of the message is printed. There is also a short loop to slow the scroll.

3 Checks to see if the pointer (B,C) has come to the end of the string. If it has, it resets it to the beginning.

4 Checks to see if the fire button has been pressed: If it has we would then GOTO the desired action, in this case the scrolling will stop.

5 Increments B and C so that the message keeps moving to the left and then returns to the beginning of the loop. When it has reached 600 it starts again by going to line 2. The loop will keep going until the fire button is pressed.

```
1 GRAPHICS 0:DIM A$(39):A$="
  HAPPY CHRISTMAS               ":B=1:C=1
0:POKE 752,1:SETCOLOR 2,0,0
2 FOR A=1 TO 600:POSITION 15,12:? A$(B
,C):FOR W=1 TO 60:NEXT W
3 IF B=29 THEN B=1:C=10
4 IF STRIG(0)=0 THEN END
5 B=B+1:C=C+1:NEXT A:GOTO 2
```

Get it right! II

```
1 85V (O)
2 JKF (A)
3 72E (W)
4 D2W (2)
5 KDE (9)
```

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JET BIKE
from Daniel Welch

THIS is a version of the Light Cycle sequence in the Tron film. The rules of the game are as for the film: If you crash your cycle in to your opponent's trail you will die and the same applies if you crash into the electrified walls that enclose the playfield.

The most remarkable thing about the game is the fact that you have a computer opponent racing against you – and all this is achieved in five lines.

The program uses data statements to control the movement of the computer and uses Boolean statements to control movement of the player with the joystick. The advantage of using these statements are that they are fast and do not take up much space in the program.

VARIABLES

P, Q	Position of computer
DP, DQ	Directions of computer
R	Locate value of computer
X, Y	Position of player
DX, DY	Direction of player
Z	Locate value of player
S	Stick(0) value

```
1 P=1:Q=19:X=78:Y=19:DX=-1:DY=0:GRAPHI
CS 21:COLOR 1:PLOT 0,0:DRAWTO 79,0:DRA
WTO 79,39:DRAWTO 0,39:DRAWTO 0,0
2 READ DP,DQ:IF DP=0 AND DQ=0 THEN RES
TORE :GOTO 1:DATA 0,1,1,0,0,-1,-1,0,0,
0
3 SOUND 0,200,12,2:LOCATE P+DP,Q+DQ,R:
IF R<>0 THEN 2
4 S=STICK(0):IF S<>15 THEN DX=(S=5 OR
S=6 OR S=7)-(S=9 OR S=10 OR S=11):DY=(
S=13)-(S=14)
5 LOCATE X+DX,Y+DY,Z:IF Z=0 THEN RESTO
RE :X=X+DX:Y=Y+DY:P=P+DP:Q=Q+DQ:COLOR
2:PLOT X,Y:COLOR 3:PLOT P,Q:GOTO 3
```

Get it right! II

```
1 GYN (5)
2 CJS (1)
3 4D2 (E)
4 NTD (S)
5 KWY (4)
```

CHRISTMAS MESSAGE
from Gary Cheung

THIS five liner is a simple program to demonstrate the graphics capabilities of Atari computers and it also sends a seasonal greeting. The program draws a Christmas tree with lights and flashes them on and off.

PROGRAM BREAKDOWN

10 Sets up graphics Mode 7, sets up colours for the background and the tree. Makes the cursor invisible and sets the left margin. The dummy PRINT statement enables the new left margin value to come into effect straight away when the message is printed in line 40. This combination enables the message in line 40 to be positioned without the POSITION command and thus reduces the length of the line.

20 Draws the Christmas tree.

30 Draws the tree lights using the colour in colour register 709.

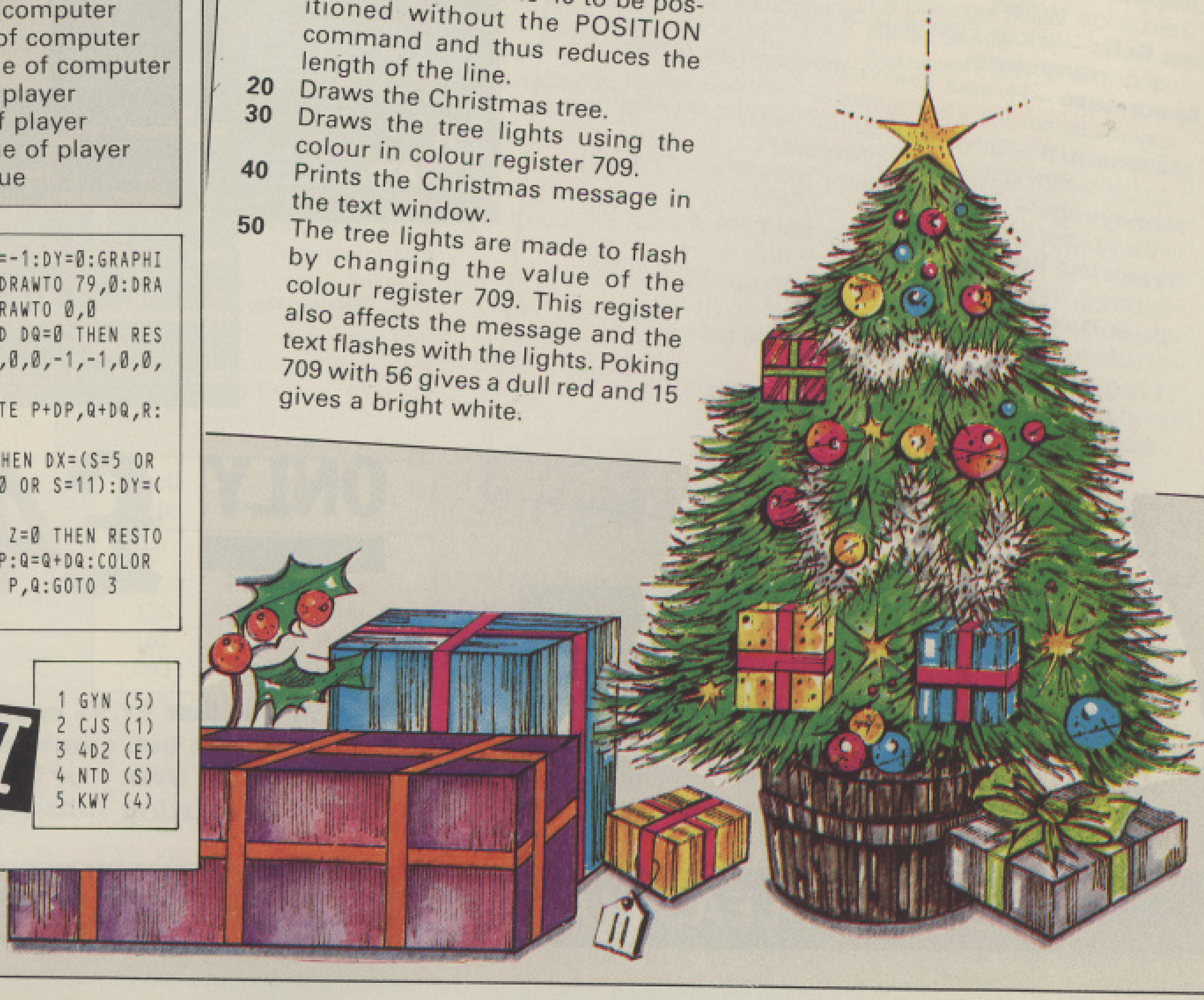
40 Prints the Christmas message in the text window.

50 The tree lights are made to flash by changing the value of the colour register 709. This register also affects the message and the text flashes with the lights. Poking 709 with 56 gives a dull red and 15 gives a bright white.

```
10 GRAPHICS 7:POKE 708,196:POKE 712,10
:POKE 710,8:POKE 752,1:POKE 82,9:? :X=
80
20 COLOR 1:FOR Y=10 TO 50 STEP 10:FOR
I=X-Y/2 TO X+Y/2:PLOT X,Y:DRAWTO I,Y+2
0:NEXT I:NEXT Y
30 COLOR 2:FOR Y=10 TO 50 STEP 10:FOR
I=X-Y/2 TO X+Y/2 STEP 2:PLOT I,Y+20:DR
AWTO I,Y+21:NEXT I:NEXT Y
40 PLOT X,9:DRAWTO X,11:PLOT X-1,10:DR
AWTO X+1,10:? "**  MERRY CHRISTMAS  **
":? :? "     from ATARI USER"
50 POKE 709,56:FOR I=1 TO 380:NEXT I:P
OKE 709,15:FOR I=1 TO 180:NEXT I:GOTO
50
```

Get it right! II

```
10 F68 (M)
20 P81 (V)
30 CAO (Y)
40 DY8 (Y)
50 Q80 (9)
```



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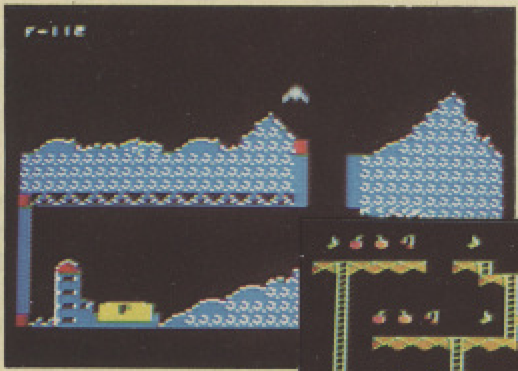
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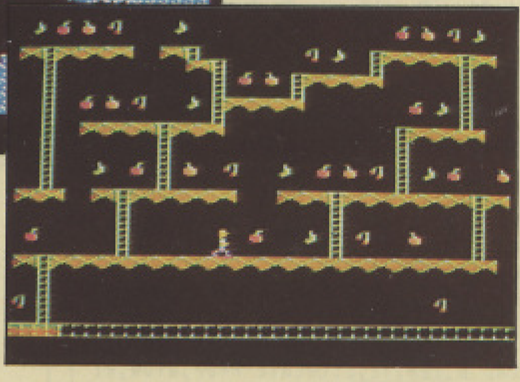
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AT11/87

Basic route to colourful triangles

I AM starting to learn Atari Basic and have written a program to draw and fill triangles in different colours. But I have come across a problem.

After drawing a red, orange, blue and green triangle in Graphics Mode 7 I found that when I tried to use different colours they didn't work. Can you explain why this is? – **James Cox, Mowbray, Leicestershire. Age 11.**

● Depending on the graphics mode you choose to work in, you are restricted to the allowed number of colours – this is usually proportionate to the resolution of the mode.

For example, in Graphics Mode 7 you have a screen resolution of 160 by 96 in four colours on a full screen.

But in Mode 11 you have a resolution of 80 by 192 pixels in 16 colours, and this will take up roughly 8k of memory before you start. But a Mode 7 display will only take up around 4k.

When deciding what colour you wish a pixel to be on screen you must first know the limitations of the mode you are working in.

It is also possible to alter the screen display by using the SETCOLOR command. This will change depending on what mode you are using and full details can be found in any Atari Basic manual.

Here are the effects created on a Graphics Mode 0 text screen:

> **SETCOLOR 1,A,B** *will alter the intensity of characters on screen.*
> **SETCOLOR 2,A,B** *will alter the screen colour.*
> **SETCOLOR 4,A,B** *will alter the border colour.*

A is the colour you want, and can be a number from 0 to 15. B is the brightness or luminance of the colour and is an even number from 0 to 14.

So by playing around with the COLOR and SETCOLOR commands you can produce various patterns and shades.

Packing in a word processor

IN my first few computer lessons on a BBC Micro I noticed there is a built-in word processor. Is it possible for me to fit one to my Atari 800XL in the same way? – **A. Faulkner, Barnstaple, North Devon.**

● The BBC Micro has space inside for several roms. These work in a similar way to cartridges on your Atari, but you can have more than one present at once. So a cartridge-based word processor such as AtariWriter is the equivalent of a built-in one.

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Looping into trouble

I WAS playing around with my Atari 400 and wrote this simple program:

```
10 FOR F=1 TO 255
20 PRINT CHR$(F);
30 PRINT F
40 FOR N=1 TO 200:NEXT N
50 NEXT F
```

When I ran it the computer seemed to go haywire and refused to do what it was supposed to do. Is my computer broken? And if not, can you explain what exactly is happening? – **G. Abott, Glenrothes, Fife.**

● Firstly, your computer is not broken. The answer is very simple: As the program goes through its loop and prints CHR$(F) to screen it is encountering Ascii control codes.

These codes will cause various different things to happen as shown in the table below. As you can see, the control codes are scattered throughout the loop that you defined and the best way for you to view them is individually.

Ascii code	Effect
27	Escape
32	Blank space
125	Clear screen
155	EOL or Return
253	Keyboard beep

If you add 128 to the Ascii of a character it will appear in inverse video. For example, ?CHR$(65) will give you A, but if you add 128 then give ?CHR$(193) you will get an inverse capital A.

Getting it right

IN the November 1987 issue of Atari User you published Get it Right II!. Are the checksums that you published for the old Get it Right! still compatible with this new super high speed version? – **Brenda Tennyson, Sandbach, Cheshire.**

● The new Get it Right creates a different checksum to the old program and so makes the two incompatible. We considered keeping the numbers the same, but decided that the advantages that could be gained by a completely new program outweighted the advantages of compatibility.

For example, a feature that the new program has that the old one didn't is a running cumulative checksum.

Tweened cartoon

AFTER typing in the excellent Tweening program from the November 1987 issue of Atari User I drew a cartoon character and tweened him between

Turn to Page 48 ▶

◀ From Page 47

two positions. I then printed out the individual screens of the animation using the OS Controller card screen dump utility.

Next I stuck the dumps together in book form and if I flick the pages quickly I have a simple animated cartoon.

Thank you for a superb utility – I'm sure that with a little patience I could make a full length cartoon using it. – **Philip Marston, Armitage, Wadd Soft.**

ATARI USER Mailbag

WE welcome letters from readers – about your experiences using the Atari micros, about tips you would like to pass on to other users . . . and about what you would like to see in future issues.

The address to write to is:

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Atari User
Europa House
68 Chester Road
Hazel Grove
Stockport SK7 5NY

No trivial pursuit

IN my experience the majority of companies today consider customer relations to be a triviality. I am very pleased to say that there is a company that can be bothered to be polite and helpful – Noahsoft.

When I bought a product called the PL65 compiler from them I had trouble including library files that contain other library files on to my data disc. I contacted the company and they replied with the solution to my problem in a very efficient and helpful way. – **Lee Fuller, Romford, Essex.**

Missing locations

I RECENTLY bought a tape version of International Karate. I enjoy sport simulations and I was very keen to play the game.

The instructions say that you fly to eight different locations around the world and fight in each, but when I started to play I found, to my horror, that I only have two locations to fight in.

Later I went to visit a friend who has a disc drive and I was surprised to find that his version has the eight locations.

Why is it that tape owners always seem to lose out on games? – **Mark Haddon, Hertford, Hertfordshire.**

● The problem with the tape version of International Karate concerns loading time. The game constantly loads new location screens, which is easy on a disc version, but if you were to load a new screen from tape the game would take far too long to complete.

Assembler required

BEING new to computing and very willing to learn, I was attempting to follow the I/O channels article by André Willey. But, try as I may, I just keep getting stuck.

I don't know how to disable Basic and input the machine code program which you published in the March 1987 issue of Atari User.

The article doesn't explain how to do this and so I was wondering if you could answer this for me? – **M. Kloss, Tamworth, Staffs.**

● To enter any machine code program you need an assembler language such as the Atari Assembler/Editor cartridge or Mac/65 from Optimised System Software. These, and others, are available from several of the advertisers in *Atari User*.

Cardsharp cornered

SOME people might have noticed something odd about the Knockout Whist program in the September 1987 issue of Atari User.

Apart from the first round the computer always seems to win when random trumps are chosen. I checked through the program and spotted where the problem occurred and corrected it with the following changes:

```
8010 RET=0:IF CHOO=0 THEN TR=
INT(RND(0)*4)+1:GOTO 8030
8020 GOTO 8080
```

This solves the problem of biased trumps. – **Simon Bawyer, Winchester, Hants.**

Sound of silence

I OWN an Atari 400 and was wondering how to turn off the noisy beeping sound I get whenever I save or load.

I use my computer mostly at night when everyone is in bed and the beeping keeps waking them up.

I was told that POKE 65,1 will turn this noise off on all Ataris, but when I tried it the beep was still there. Could you tell me how to get rid of this annoying sound? – **L. J. Hawkes, Southend, Essex.**

● The beep that comes from from an XL/XE computer is generated through the TV speaker. But on an Atari 400 there is a small speaker inside the micro.

This can easily be turned off by unplugging the wire from the board altogether or placing a switch between it and the speaker.

Nice line in language

I RECENTLY bought Turbo Basic from Stortsoft and was stunned by the quality of the product. The package contains the Basic with a compiler and although it doesn't contain all the commands that you get with other Basics, say for example Basic XL, it does leave the old Atari Basic language standing.

So if you feel like a new language for your Atari I would recommend you try it. – **A. Griffith, Wimborne, Dorset.**

Printing out a document

I HAVE had Mini Office II for four months now and think it's a great package, but I do have one small problem with the spreadsheet.

When I save data from that module and then try to load it into the word processor to print it out in a document all I get is a mess of characters. Am I using the package wrongly? – **Monica Harris, Maidstone, Kent.**

● You're using the package correctly, but I'm sorry to

say that the spreadsheet only integrates with the graphics package. You could print out the part of the spreadsheet you want and then print the document.

Card for the 65XE

AFTER reading the review for the OS Controller card in the November issue of Atari User *I decided to buy one and have it fitted to my 130XE by Computerhouse, where I obtained very prompt and professional service.*

I am about to buy a new 65XE games console to add to my collection of Atari computers and was wondering if the card will plug into it. – **Keith Pattison, Middlesbrough, Cleveland.**

● The card you bought is designed to work on your 130XE only, but Computerhouse is planning to bring one out that will fit inside the 65XE.

Doctor Boris diagnosis

I TYPED in the program Doctor Boris from the October 1987 issue of Atari User *and checked it very carefully but I still get an Error 8 at line 1020.*

If I take out this line the program runs, but not correctly. Is there an error in this line? – **Michael Cain, Beeston, Nottingham.**

● The listing that appeared in the magazine contained no errors. The message for Error 8 is:

INPUT/READ type mismatch error: Attempting to enter a non-numeric value for a numeric variable.

Check your data statements between lines 1040 and 1510. You will probably find that your mistake is somewhere there.

It may well be that you have a letter instead of a number, a comma at the end of a line, full stop instead of a comma or an extra comma were there shouldn't be one.

Cruel to edge connections

FOR a while now I have been programming using OSS's Mac/65 cartridge to write routines that can be called from Basic.

In order to test them I have to remove my Mac cartridge and reboot the system with Basic. All this removing and replacing isn't exactly beneficial to the cartridge edge connector.

Do you or any of your readers know of an edge connector extension that could be fitted to save wear and tear?

Or better still a device that could be fitted between the cartridge port and the cartridge that would allow me to switch the cartridge out without having to remove it? – **A. Crawford, Laceby, North Grimsby.**

● If you own a 130XE the supra hard disc interface would give you a vertical slot for your cartridge. This will reduce wear and tear on the port on the computer.

Pokes for games

IS it possible for you print some pokes for Atari games like those I've seen for other computers? Or is there something unusual about games on the Atari that makes this impossible? – **Sean Canningh, London.**

● With a lot of computers the games are loaded using a Basic loader routine. This can often be modified or pokes can be entered first and remain active as the program runs. But on the Atari, machine code games are loaded using a procedure called Boot.

This is done by a combination of the Start, Option and Select keys being held down as the computer is switched on. This causes the game(s) to be loaded directly into memory so there is no way you can enter a poke. Also most games software on the market today require you to switch Basic off, which makes it very difficult to give you any pokes on the Hints and Tips page.

Helpful review

I OWN a Panasonic KPX-1081 printer and was very interested in the review you published on this model in the October 1987 issue of Atari User.

After reading it I proceeded to experiment with my printer and discovered a lot of interesting features. Thank you for a superb review, keep them coming. – **Mike Barstow, Birchwood, Cheshire.**

Amateur radio

THERE must be thousands of amateur radio operators worldwide who, like me, are also Atari computer fans.

But could you tell me if there is a program or interface that will enable me to receive teleprinter signals on my radio and pass them to my 800XL so I can view them on the screen and finally print them out? – **Sid Thompson, Leyland, Lancs.**

● We don't know of any programs or add-on that will do what you want, but the Radio Society of Great Britain may be able to tell you of a product to solve your problem. Their address is: Radio Society of Great Britain, Lambda House, Potters Bar, Herts.

Adding on to the 800XL

A LOT of computers these days seem to have the expansion capabilities necessary for adding a second processor, the most common of which is the Z-80. Is there such an add-on for my 800XL? – **Steve Ward, Newcastle-Upon-Tyne.**

● Quite a while ago Atari did mention that it was about to bring out a second processor for the 8 bit computers. The package was called the Atari CP/M Module and was an external microprocessor upgrade that would allow CP/M software to be used on all 8-bit Atari computers.

This add-on plugs into the serial port and offers the following features:

- Z-80 microprocessor
- 4.0 MHz processing speed
- 64k ram
- CP/M 2.2 operating system
- 40/80 column video output (switchable)
- Serial input/output port
- Monitor output

Unfortunately, Atari never released this package in Britain, which is a pity because it would have been popular on a market that is always crying out for more.

Enter the magical world of Kerovnia!



This fascinating adventure features the most sophisticated parser around: You can type complex sentences and interact with the many characters, including some very intelligent animals.

This superb package includes a 44-page novel and a cryptic help section.

"The program took three man years of programming time to produce – and it shows. The Pawn is the stuff from which cults are made."

– Anthony Ginn, Atari User, May 1986







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– Bob Chappell, Atari User, October 1987

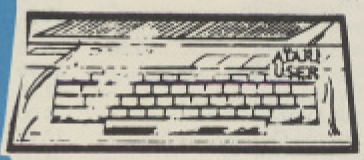
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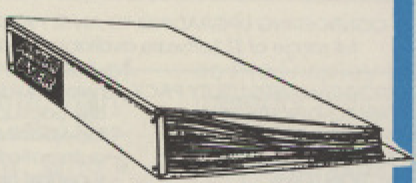


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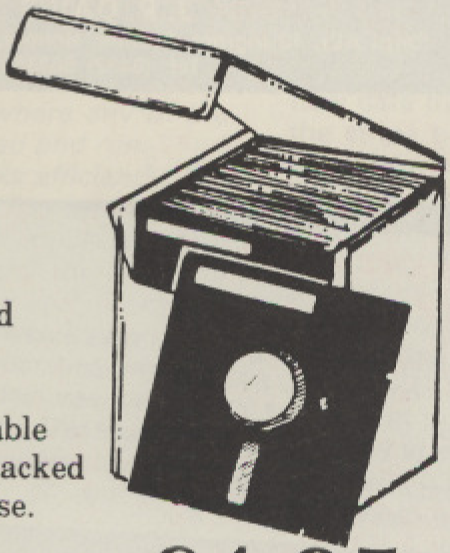
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SOFTWARE *Solutions*

Your programming problems solved by ANDRÉ WILLEY

I'VE had a tremendously varied set of questions from you this month, starting with a problem from Timothy Harrington from Portsmouth who's having trouble with his memory.

❛ *I have been a regular reader of* Atari User *since 1985 and now have quite a library of your games on disc, together with a menu selection program which runs them. I have slightly modified each program so that when I have finished playing the game I can press an exit key to re-run the menu program where any of the games can be selected and run.*

Generally this works efficiently, but if the previous game has used Player/Missile Graphics or machine code routines – which many do – vertical lines of squares are left flickering across the screen. These can only be cleared by pressing the System Reset key. Sometimes the following game will not run at all, or the screen display is corrupted, and often the only way to cure this is to power off and restart from scratch.

Obviously data is being left behind in the memory by the preceding program and this is interfering with the next one. For example, if I run Cubes in Space after Chopper Rescue I usually find that once I have completed the first screen of Cubes nothing happens, or only the bottom of the screen moves to the left. Is there a routine – it will probably have to be written in machine code to be fast enough – to clear out any left behind data? It is awfully inconvenient to have to re-power every time. ❜

Well Timothy, there are actually a number of problems to be considered to allow you to freely move between Basic game programs. Firstly, as you have noticed, Player/Missile Graphics don't clear themselves properly when you have finished with them.

Secondly you might find that some Vertical Blank or Display List Interrupt routines are still running. Finally the program might have adjusted some of the OS or Basic work variables – such as the Display List pointer or the top of memory indicator.

To clear the PMG data is slightly more complex than just POKEing the enable register to off with the command POKE 559,34. This will stop the ANTIC graphics chip from getting bytes of player data from memory, but will leave GTIA – the display generator – free-running with random data giving the flickering vertical stripe you have noticed.

You can tell GTIA to stop reading new data by using POKE 53277,0 and the stripe becomes solid, which is at least some form of improvement. GTIA in fact contains a number of temporary registers which hold the incoming PMG data until it can be processed, and since these haven't been specifically zeroed they will still contain the last byte of data received from ANTIC – hence the solid stripe based on that data.

The four player registers are located at 53261-53264 ($D00D-$D010), and the single missile register is at 53265 ($D011). These must all be set to zero, and while we're doing that we might as well re-set the PMG position and size registers at 53248-53260 ($D000-$D00C) and the PRIOR and VDELAY bytes at 53275 ($D01B) and 53276 ($D01C).

Now that we've dealt with the PMGs let's turn off any user-defined interrupts which may be running. The DLI vector is at 512,513 ($200,$201) and the Immediate and Deferred mode Vertical Blank Interrupts (VBI's) are at 546,547 ($222,$223) and 548,549 ($224,$225) respectively.

The normal contents of these registers will depend on the age of your machine and the type of OS it contains. The easiest way to find out what number to POKE into them is to use PEEK to find the original value of each location **before** you run any programs at all, and change lines 1120 to 1140 accordingly. I've used the standard 130XE values, but make sure they are set correctly for your machine or it could be *goodbye program* time.

One point to note here is that you can't just POKE the new values straight in since the OS may want to use any of the vectors at any time, even after you've changed one byte but not the other. Thus you should make sure to turn off all interrupts with POKE 54286,0, then POKE the new values into place and only then turn the VBI system back on with POKE 54286,64.

Next you should re-set the RAMTOP high memory pointer in case the previous program has tried to reserve space at the top of memory by adjusting it. This can be achieved by using POKE 106,160 for a machine with more that 40k of memory. Again, you can find out the normal contents by turning the computer off and on again and then using the command PRINT PEEK(106).

Finally, just to be sure, you should do a GRAPHICS command to set the Display List back to its normal location. I'm not saying that these measures will cure every possible problem

```
10 REM CLEAR MEMORY AFTER PROGRAM.
20 REM ADD THESE LINES AT END OF
30 REM OFFENDING PROGRAM.
40 REM MAY BE RE-NUMBERED.
50 REM ADJUST LINES 1120, 1130,
60 REM 1140 & 1210 ACCORDING TO
70 REM YOUR COMPUTER'S NORMAL
80 REM VALUES FOR THE LOCATIONS
90 REM 1000 REM CLEAN-UP PMG REGISTERS
1010 POKE 559,34
1020 FOR BYTE=53275 TO 53277
1030 POKE BYTE,0 1040 NEXT BYTE
1050 FOR BYTE=53248 TO 53265
1060 POKE BYTE,0
1070 NEXT BYTE
1100 REM RESET INTERRUPT VECTORS
1110 POKE 54286,0
1120 POKE 512,206:POKE 513,192
1130 POKE 546,226:POKE 547,192
1140 POKE 548,138:POKE 549,194
1150 POKE 54286,64
1200 REM RESET RAMTOP/DLIST
1210 POKE 106,160
1220 GRAPHICS 0
```

Listing I: Memory clearing routine

Turn to Page 54 ▶

◀ From Page 53

you might encounter – games programmers are a perverse bunch at the best of times. However, Listing I *should* cure most of the common faults, and at least give Basic and the OS a fighting chance to do their job correctly.

Merging Basic programs

Now let's move on to another problem. **Mr K.R. Henwood** from Pembroke Dock, Dyfed writes:

I am writing a program in Basic for an 800XL and 1050 disc drive in which I want to interchange different blocks of DATA statements from within the main program – using the ENTER command. For example:

```
100 ON I GOSUB 500,600,700
110 REM REST OF THE PROGRAM
500 ENTER "D:DATA1.LST": RETURN
600 ENTER "D:DATA2.LST": RETURN
700 ENTER "D:DATA3.LST": RETURN
```

This works fine, but when the new segment has been loaded into the computer execution of the program stops and the READY prompt appears. Can the 800XL be re-programmed to continue execution of the main program automatically after the extra lines have been ENTERed from the disc? At the moment I have to restart the program every time with a direct GOTO command in order not to wipe out other data which is stored in arrays.

There is an answer to your problem, and one which may prove useful in solving many other programming difficulties too.

As you have correctly stated, the ENTER command was designed to work in direct mode rather than as a program statement. So it returns control to the editor rather than to the currently resident program. What is needed is a way to control the editor's operation from within a program...

Impossible? No, not really. You need to use a trick often known as 'Return-Key Mode', in which you are able to print whatever commands you like onto the screen and have the Basic interpreter execute them just as if you have pressed Return at the end of each line – hence the name.

Listing II is a small program to illustrate the technique, but you could expand it to do much greater things – including allow a program to modify itself directly. Here's how it works:

Lines 10 to 110 set up a string which contains the main portion of the filename. Assuming you use a single number to indicate each separate file then all you need to do is alter that byte within the string – in this case character number 7. Thus line 110 replaces the lowercase X in the string with the number contained in NUMB.

Next comes a GRAPHICS 0 command to avoid corruption from any old lines of text which may still be on the screen. The POKE 559,0 simply turns off the display while the clever stuff goes on – omit it if you want to watch the system in action.

Next lines 130 and 140 print the two instructions which we want to execute in immediate mode. The two blank PRINTs between each line are to allow for Basic's READY message which will be printed after each immediate mode task is finished.

Since we want to print a quotes symbol and this can't be done from within a string I have used it's Ascii value – CHR$(34) – instead. Thus line 130 will print

ENTER "D:DATAx.LST

Once the two lines have been printed the cursor is placed just above the first command to be executed and Return-Key mode is enabled using POKE 842,13. Immediately after this the STOP command temporarily halts the program with the message STOPPED AT LINE 140.

Since Return-Key Mode has been set the screen editor won't wait for you to type a command and hit Return – it will instead go straight on to execute the first line it comes to, which will in this case ENTER the new lines for you. Then it will carry on and find the CONT command which will re-start your program.

The line immediately after CONT should always be POKE 842,12 to disable Return-Key Mode before you continue with the rest of your program. I've also added a GRAPHICS 0 to turn the screen back on.

This method can be used to do almost anything you want, but it's always best to experiment until you get it just right – some commands such as LIST and the graphics oriented instructions would not be suitable.

```
10 DIM FILE$(20)
20 REM NUMB WILL BE 1,2,3 or 4
30 REM TO INDICATE FILE NUMBER
100 FILE$="D:DATAx.LST"
110 FILE$(7,7)=CHR$(NUMB)
120 GRAPHICS(0):POKE 559,0
130 ?: ?: ?"ENTER ";CHR$(34);FILE$
140 ?: ?: ?"CONT"
150 POSITION 0,0
160 POKE 842,13
170 STOP
180 POKE 842,12
190 GRAPHICS 0
200 REM NEW LINES ARE NOW LOADED
```

Listing II: Return-Key Mode demonstration

Before I disappear for another month there's just time to mention a letter I've received from **Chris Simon** from Mold in Clwyd who has just typed in Get It Right II! from the November issue of *Atari User*. Not realising that we'd be printing the full source listing this month he went ahead and disassembled it for himself, and found various messages within the code, such as:

```
SELECTION MENU FOR D2
2) INIT DRIVE
3) CHANGE DRIVE #
4) SET NEW OFF
```

He wondered if this is an extra utility provided for more experienced users, and if so how it might work.

Well, sorry to disappoint you, Chris, but it's not an extra utility. If you look at the machine code program on Page 57 you will see that there is a 256 byte buffer defined near the end of the listing. As with most other assemblers, my own MAC/65 cartridge creates this space by simply skipping the relevant number of bytes, leaving any existing memory contents intact.

In order to configure my 1050 to work correctly with my hard disc and SpartaDos I have set up an AUTORUN file which re-programs the system to my requirements at boot time, and it is a portion of this code that inadvertently slipped into the GIR II object file. These bytes could just as easily be zeros, of course, as all they do is pad the boot file out to the required length.

Next time we print the Basic version I'll modify it to skip that area completely and thus save you about 10 lines – although it won't affect the size of the machine code version. Anyway, well spotted Chris. I hope that the listing in this issue will be of interest to you.

Ah well, that's about it for another month. All that remains is for me to wish you all the very best for a great Christmas – and wait for the deluge of mail which will come in from all those new Atari XE games console owners early in the New Year.

Merry Christmas all.

Are you having problems getting your programs to work? Write to Software Solutions, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY. We will answer as many as we can within the pages of *Atari User* but, unfortunately we cannot give personal replies.

Email is good business

BOOKSELLERS Graeme Roberts and Tony Swann, who first got in touch through MicroLink's bulletin board, are finding electronic mail makes for good business.

Graeme made a 12,900 per cent profit on a battered copy of Sowerby's Exotic Mineralogy he sold to Tony, a director of natural history specialists Wheldon & Wesley.

"I bought the book for £1 from a local junk shop after seeing Wheldon & Wesley's advertisement on the MicroLink BB", said Graeme. "I thought it was probably worth more than I paid, but had no idea I would get as much as £130".

Tony Swann was equally delighted with the deal. "After a couple of hours hard work with a soft rubber I was able to remove the accumulated dust and grime of 175 years and turn it into a quite reasonable copy which I sold on the phone to a collector in America for £240 the same day", he said. "The three of us are very happy, and it's all thanks to MicroLink".

The aged scientific tome was a change of theme for Graeme who specialises in out-of-print science fiction, fantasy and horror and is currently expanding into supplying dealers and collectors in the US. His main reason for joining MicroLink is its "enormous potential for speeding communications" with his clients.

Tony also considers MicroLink an extremely useful business tool. "It isn't just because of increasing sales and purchases", he says. "I travel a lot around Britain and Europe and find the Official Airlines Guide saves me much time at the travel agency. Telex and the British Rail timetables come in handy too.

"Overall I'm delighted with the system and it's certainly beginning to pay for itself".

Cut the cost of fashion

PEOPLE can now dress themselves from head to toe in the latest fashions with the help of MicroLink.

London company Twillfine is using the system to advertise High Street chain store fashion wear at a fraction of normal retail prices.

The garments aren't seconds – they're warehouse stock which has to be cleared to make room for new lines.

Twillfine's prices are as low as £4 for blouses usually priced £14.99 and £1.50 for shirts which normally retail at more than £13.

YOUR chance to join MicroLink – Page 18

New board for chess

MICROLINK subscriber Keith O'Connell has challenged the world to a giant electronic game of chess.

Playing on the MicroLink bulletin board he says he is willing to take on anyone of average standard.

"I don't mind how many games I play at once", he said. "Anyone who wants to take part can just mailbox me with their moves in response to my game on the bulletin board.

"All I ask is that my opponents play for themselves, and don't just use a computer chess program to decide their moves. I want to play people, not a computer – I can do that on my own at home".

Micro muscles

MICROLINK subscriber Theo van der Meer has launched a search for software authors with experience of writing for peripherals.

He wants them to help him develop a device which allows people with severe muscular problems to use computers.

Theo's company, Preston Communications, is UK distributor for a Dutch product that links a muscle or several muscles to a joystick, allowing people with all kinds of muscular diseases to control a micro.

The device, which takes over the five joystick functions, has just completed clinical trials in Holland and is now being tested here.

"Our problem is that all the programs to control the device are currently written for the Commodore and we need to have them re-written for other machines such as the BBC Micro, IBM PC and compatibles, Atari, Apricot, Apple and Macintosh", said Theo. "We will of course gladly pay for this work".

Tower triumph

TWO years after finding himself out of a job at the age of 56, Yorkshireman Philip Gibbs is boss of his own company and poised for success.

With the help of his computer and MicroLink he has launched Sheffield Skyhook to manufacture self-erecting towers for closed circuit TV systems.

Now his project is nearing completion he is also receiving financial support from British Steel, British Coal and the Department of Industry prior to going into full production.

Philip has been using MicroLink to improve his communications with the various agencies he deals with, and has also found the Kompass Online directory of UK companies invaluable as a source of potential customers.

"At the moment we are using MicroLink mainly for telex", said Philip. "But when we finally get going full swing we'll be making use of Email as well".

Get it right! II

ANDRÉ WILLEY gives a detailed breakdown of our checksum program

LAST month's Basic program is quite sufficient to generate all the checksums you will ever need, but we are now going to look at the machine code version.

This will allow experienced programmers to tailor it to their own needs, but you should note that you don't need to understand the inner workings of either version in order to use Get It Right II! to check your listings.

The program is written in pure machine code, with a simple Basic routine to make to boot tape or disc. So, unlike the original Get It Right!, there's no easy way for you to see what's going on when you use it.

Get It Right II! is a fully re-locating piece of machine code – which means that it can place itself anywhere in memory adjusting automatically to take account of its new position. Even its work space is internal, so it won't interfere with anything else you may have loaded, including page 6 space.

If you want to write your own code to interface with ours then you will require a non-relocating version, and that's what we've printed here.

You can specify a new origin address simply enough by changing the ***=$0700** definition on line 140, but once you've assembled it for a given address it must always be loaded there.

Listing I is the assembly code for the cassette version, and contains all the necessary information to make a boot tape.

If you want to make a disc version, first type in the listing using an assembler/editor and then enter the extra lines given in Listing II. These will overwrite any cassette-specific

PROGRAM BREAKDOWN

180 – 210 Only applicable to the cassette version and contain the six boot header bytes.

230 The first line of code to be run – simply jumps to the setup code starting at line 3490.

250 – 320 The handler vector table for CIO use – refer to the recent series on I/O Channels for more information.

360 – 450 Define the ten internal work bytes used for data storage and condition flags.

470 – 690 Perform the CIO Open command. Firstly the buffer pointer and cumulative checksum digit are cleared, then the zero page IOCB is accessed to find the address of the filespec buffer. This should contain either "G:S" or "G:P", and the OUTVEC flag is set accordingly – or if neither is found an error 139 is generated. As with all CIO commands, the routine is normally exited by setting the Y register to a value of one and performing an RTS instruction (lines 770 and 780).

710, 730 and 750 Perform the CIO Status, Special and Close functions – all of which simply return with the Y register set to one.

800 and 810 Used to return an error 137 if the line length is over 255 characters (the maximum buffer length). Using Basic this should never happen, but it's always best to check for all possibilities.

830 and 840 Return an error 146 should the user mistakenly try to GET bytes from the G: handler.

860 – 930 Contain the Put-byte routine. This dumps the byte into a buffer area, increments the buffer pointer and returns. If the byte is 155 – the End-Of-Line marker – then the routine jumps to the CALC section of the program which is where the actual checksum is created.

950 – 1110 Output a single Ascii character to the screen or printer, depending on the value of OUTVEC. The address of the relevant Put-byte routine within the Operating System is retrieved from the appropriate CIO vector table and this is then pushed onto the stack. The byte to be printed is stored in the A register and the routine is called by executing an RTS.

This method works because a JSR instruction places the return address on to the stack in the same way we placed the Put-byte address. When an RTS is found the address to return to is always pulled back off the stack – and so in this case it jumps to our Put-byte routine.

This is a cheating way to generate an indirect JSR instruction, which is not included in the standard 6502 instruction set.

1150 – 1940 Use this character output routine to print out the checksum line. Firstly the line number is printed – stopping at the first space found – then lines 1430 to 1490 get and print the first digit, lines

lines with the appropriate disc instructions.

Once the disc version is assembled it can be used as an AUTORUN.SYS file, or just a straightforward binary-load if required.

The program breakdown shows how it all works. But remember, the listing printed in last month's *Atari User* is functionally identical to this assembler version, but obviously has some practical differences due to its ability to locate itself anywhere in memory.

This is achieved partly by increased use of relative branch instructions but mainly from the use of a relocation table near the end of the load space. This ensures that any position dependent instructions are modified as they are moved from the load address of $3000 to their new location just above the original LOMEM.

So now you have Get It Right II! in two versions – a user version and one that you can modify to suit your own requirements. We'd be very interested to hear your comments on the new system, and of any modifications or additions which you dedicated programmers might come up with.

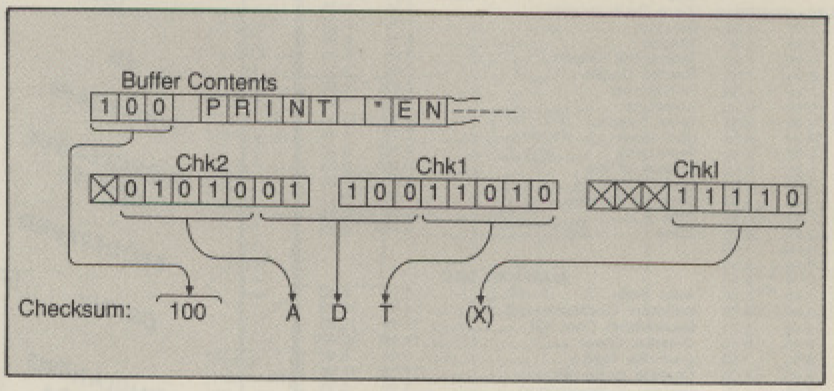


Figure I: Calculating the checksum digits

Listing I: Get-it-Right cassette version

```
10 ;GET IT RIGHT V/2.0
20 ;
30 ;WRITTEN BY ANDRE WILLEY, 1987
40 ;
50 ;N.B. NON-RELOCATING CASS VERSION
60 ;
70 HATABS =  $031A
80 ZIOCB =   $20
90 EDVEC =   $E400
0100 PRVEC = $E430
0110 EOL =   $9B
0120 SPACE = 32
0130 ;
0140     *=  $0700
0150 ;
0160 ;CASSETTE HEADER BLOCK
0170 ;
0180 START .BYTE 0
0190     .BYTE [FIN-START+127]/128
0200     .WORD START
0210     .WORD INIT
0220 ;
0230 RUN JMP SETUP
0240 ;
0250 VECTAB ;        HANDLER VECTORS
0260     .WORD OPEN-1
0270     .WORD CLOSE-1
0280     .WORD GET-1
0290     .WORD PUT-1
0300     .WORD STATUS-1
0310     .WORD SPECIAL-1
0320     JMP EXIT
```

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1500 to 1660 print the second and lines 1670 to 1710 the third.

Five bits of data are used for each digit, giving a number between 0 and 31 (see Figure I). This number is then used as an index into the table of valid letters and numbers (lines 3060 and 3070). Note that letters such as I, O and Z are missing to avoid any confusion with the numbers 1, 0 and 2.

Finally lines 1740 to 1940 print the cumulative digit, surrounded by brackets, and then a Carriage Return. The buffer is then cleared ready for the next line and CIO is exited via an RTS instruction.

1960 – 2990 The part that actually calculates the checksum itself. When a Carriage Return is detected the buffer is scanned, character by character, adding up the coded values for each byte. When the line is completed, or when a rem is encountered, the print-out routine starting at line 1150 is called. The process used is quite complicated and is best understood in flow chart form – as shown in Figure II.

3010 and 3020 Contain the text strings for rem and data to allow for testing and setting flags accordingly.

3060 and 3070 Contain the list of valid characters which may be used for the checksum printouts.

3090 – 3420 Provide the initialise code required for correct system reset handling. This includes looking for a blank entry in the OS's handler address table (HATABS) and inserting the address for our own G: driver, then setting MEMLO, LOMEM and APPMHI to tell the system where our code ends. After zeroing the temporary work space the INIT code returns control to the OS, which in turn re-starts Basic.

3440 Defines the 256 byte text buffer used for storing program lines until their checksum has been printed.

3470 – 3700 Executed from the boot loader to set the CASINI (or DOSINI) vector to point to our initialise routine. For disc users, they also set up an extra JSR within the INIT code to execute the original DOSINI vector in order to maintain DOS's own pointers.

This setup routine does two other things – it prints the "Loaded OK" message and it sets Basic's Load in Progress flag (location 202) to a value of one. This has the effect of making Basic do a cold-start which will reset its pointers with the new LOMEM values to leave space for our code.

Since this portion of machine code will only be needed at boot time it is placed outside the LOMEM protected area, which means that it will be erased after it has done its job.

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```
Ø33Ø ;
Ø34Ø ;WORK DATA AREA
Ø35Ø ;
Ø36Ø CHKI .BYTE Ø     ;CUMULATIVE BYTE
Ø37Ø CHK1 .BYTE Ø     ;CHECKSUM BYTE 1
Ø38Ø CHK2 .BYTE Ø     ;CHECKSUM BYTE 2
Ø39Ø BUFPTR .BYTE Ø   ;BUFFER POSITION
Ø4ØØ DATA .BYTE Ø     ;1=DATA MODE
Ø41Ø STRING .BYTE Ø   ;1=IN STRING
Ø42Ø SHIFT .BYTE Ø    ;# OF SHIFTS
Ø43Ø OUTVEC .BYTE Ø   ;P: OR S:
Ø44Ø TEMP1 .BYTE Ø
Ø45Ø TEMP2 .BYTE Ø
Ø46Ø ;
Ø47Ø OPEN LDA #Ø
Ø48Ø      STA CHKI
Ø49Ø      STA BUFPTR
Ø5ØØ      LDY #2       ;TEST P: OR S:
Ø51Ø      LDA (ZIOCB+4),Y
Ø52Ø      CMP #':
Ø53Ø      BNE OP1
Ø54Ø      INY
Ø55Ø      LDA (ZIOCB+4),Y
Ø56Ø OP1  CMP #EOL
Ø57Ø      BEQ SET.S
Ø58Ø      CMP #'S
Ø59Ø      BEQ SET.S
Ø6ØØ      CMP #'E
Ø61Ø      BEQ SET.S
Ø62Ø      CMP #'P      ;SET MODE="P:"
Ø63Ø      BNE OPERR
Ø64Ø      STA OUTVEC
Ø65Ø      BEQ EXIT
Ø66Ø OPERR LDY #139   ;SET DEVICE NAK
Ø67Ø      RTS
Ø68Ø SET.S LDA #'S    ;SET MODE="S:"
Ø69Ø      STA OUTVEC
Ø7ØØ ;
Ø71Ø STATUS
Ø72Ø ;
Ø73Ø SPECIAL
Ø74Ø ;
Ø75Ø CLOSE
Ø76Ø ;
Ø77Ø EXIT LDY #1      ;RETURN (I/O OK)
Ø78Ø      RTS
Ø79Ø ;
Ø8ØØ OVERRUN LDY #137 ;TRUNCATED REC.
Ø81Ø      RTS
Ø82Ø ;
Ø83Ø GET LDY #146     ;NO GET FUNCTION
Ø84Ø      RTS
Ø85Ø ;
Ø86Ø PUT LDY BUFPTR   ;TRANSFER BYTE
Ø87Ø      CPY #255     ;OF DATA TO
Ø88Ø      BEQ OVERRUN  ;BUFFER AREA
Ø89Ø      STA BUFFER,Y
Ø9ØØ      CMP #EOL     ;END-OF-LINE?
Ø91Ø      BEQ DO_SUM   ;YES - CALCULATE
Ø92Ø      INC BUFPTR   ;NO - RETURN
Ø93Ø      BNE EXIT
Ø94Ø ;
Ø95Ø CHOUT TAY        ;OUTPUT BYTE
Ø96Ø      LDX #Ø
Ø97Ø      LDA OUTVEC
Ø98Ø      CMP #'P
Ø99Ø      BEQ PRTR
1ØØØ SCRN LDA EDVEC+7 ;GET E: DRIVER
1Ø1Ø      PHA          ;PUTBYTE ADDRESS
1Ø2Ø      LDA EDVEC+6  ;AND EXECUTE IT
1Ø3Ø      PHA
1Ø4Ø      TYA
1Ø5Ø      RTS
1Ø6Ø PRTR LDA PRVEC+7 ;GET P: DRIVER
1Ø7Ø      PHA          ;PUTBYTE ADDRESS
1Ø8Ø      LDA PRVEC+6  ;AND EXECUTE IT
1Ø9Ø      PHA
11ØØ      TYA
```

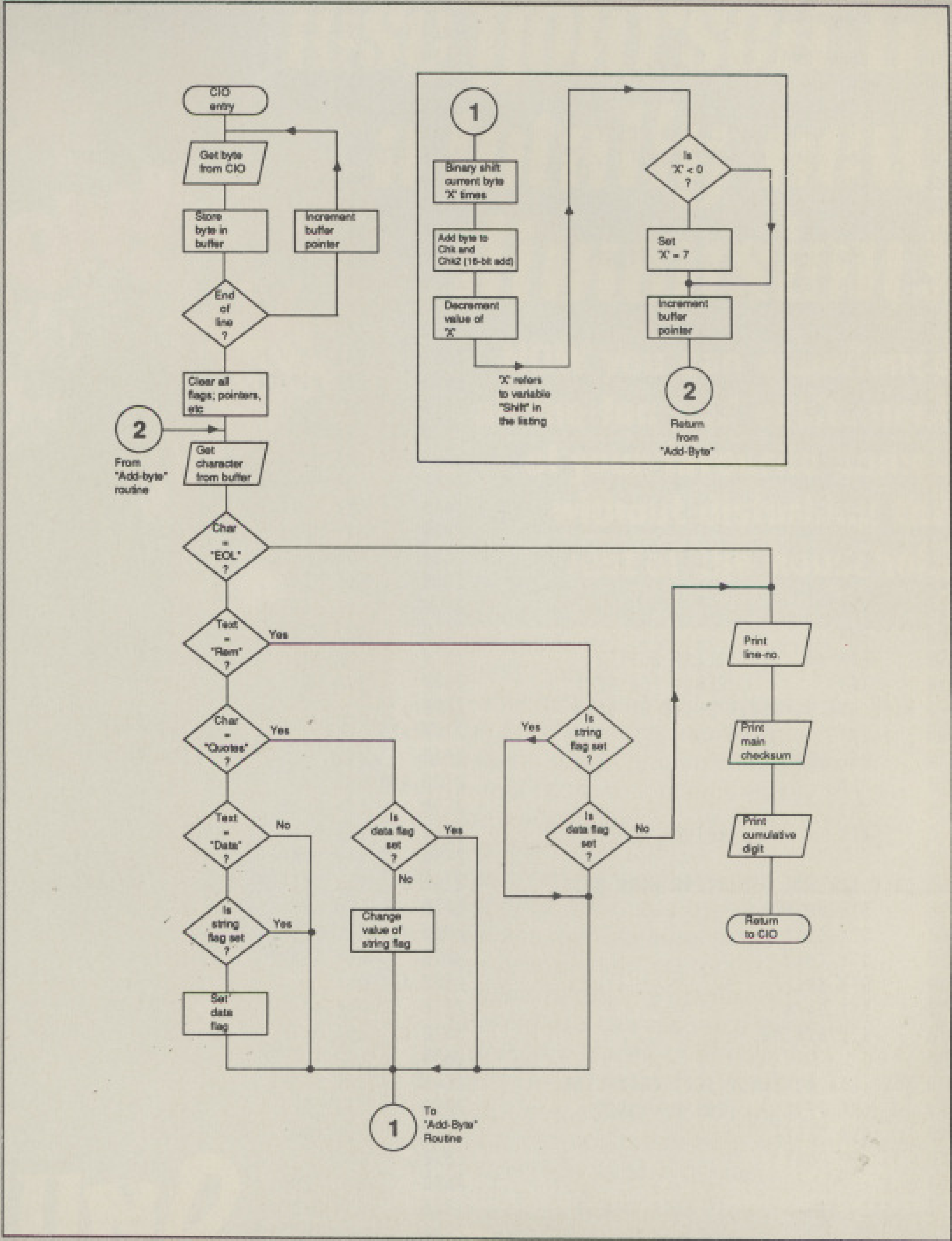


Figure II: Flow chart showing the process used for adding a byte to the checksum

```
111Ø      RTS
112Ø ;
113Ø DO_SUM JMP CALC
114Ø ;
115Ø POUT LDY #255    ;PRINT LINE No.
116Ø SP   INY
117Ø      LDA BUFFER,Y
118Ø      CMP #EOL
119Ø      BEQ SP1
12ØØ      CMP #SPACE
121Ø      BNE SP
122Ø SP1  CPY #5
123Ø      BCS P1
124Ø      STY TEMP1
125Ø      LDA #SPACE
126Ø      JSR CHOUT
127Ø      LDY TEMP1
128Ø      INY
129Ø      BNE SP1
13ØØ P1   LDY #Ø
131Ø P2   STY TEMP1
132Ø      LDA BUFFER,Y
133Ø      CMP #SPACE
134Ø      BEQ P3
135Ø      CMP #EOL
136Ø      BEQ P3
137Ø      JSR CHOUT
138Ø      LDY TEMP1
139Ø      INY
14ØØ      BNE P2
141Ø P3   LDA #SPACE  ;PRINT SPACE
142Ø      JSR CHOUT
143Ø      LDA CHK2    ;GET DIGIT 1...
144Ø      AND #124
145Ø      LSR A
146Ø      LSR A
147Ø      TAY
148Ø      LDA ASCII,Y
149Ø      JSR CHOUT   ;...AND PRINT
15ØØ      LDA CHK2    ;GET DIGIT 2...
151Ø      AND #3
152Ø      ASL A
153Ø      ASL A
154Ø      ASL A
155Ø      STA TEMP1
156Ø      LDA CHK1
157Ø      AND #224
158Ø      LSR A
159Ø      LSR A
16ØØ      LSR A
161Ø      LSR A
162Ø      LSR A
```

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```
1630      ORA TEMP1
1640      TAY
1650      LDA ASCII,Y
1660      JSR CHOUT    ;...AND PRINT
1670      LDA CHK1     ;GET DIGIT 3...
1680      AND #31
1690      TAY
1700      LDA ASCII,Y
1710      JSR CHOUT    ;...AND PRINT
1720      LDA #SPACE
1730      JSR CHOUT
1740      LDA #'(
1750      JSR CHOUT
1760      LDA CHKI     ;GET CUMULATIVE
1770      AND #31      ;DIGIT...
1780      TAY
1790      LDA ASCII,Y
1800      JSR CHOUT    ;...AND PRINT
1810      LDA #')
1820      JSR CHOUT
1830      LDA #EOL     ;CARRIAGE RETURN
1840      JSR CHOUT
1850      TYA
1860      PHA
1870      LDA #0       ;CLEAR BUFFER
1880      TAY          ;READY FOR NEXT
1890 WIPE STA BUFFER,Y ;LINE OF DATA
1900      INY
1910      BNE WIPE
1920      PLA
1930      TAY
1940      RTS          ;RETURN TO CIO
1950 ;
1960 CALC LDY #0       ;CLEAR WORK DATA
1970      STY BUFPTR
1980      STY CHK1
1990      STY CHK2
2000      STY SHIFT
2010      STY DATA
2020      STY STRING
2030 ;
2040 MORE LDA BUFFER,Y ;GET CHARACTER
2050      CMP #EOL     ;END-OF-LINE?
2060      BNE TEST1
2070      JMP POUT
2080 ;
2090 TEST1 TYA         ;IS TEXT "REM" ?
2100      PHA
2110      DEY
2120      DEY
2130      DEY
2140      LDA BUFFER,Y
2150      CMP #':
2160      BEQ T1
2170      CMP #SPACE
2180      BNE TEST2
2190 T1   LDX #3
2200 T1A  INY
2210      LDA BUFFER,Y
2220      CMP TEXTR-1,X
2230      BNE TEST2
2240      DEX
2250      BNE T1A
2260      PLA
2270      TAY
2280      LDA STRING
2290      BNE ADD
2300      LDA DATA
2310      BNE ADD      ;NO - ADD VALUE
2320      JMP POUT     ;YES - PRINTOUT
2330 ;
2340 TEST2 PLA         ;INSIDE QUOTES?
2350      TAY
2360      LDA BUFFER,Y
2370      CMP #'"
2380      BNE TEST3
2390      LDA DATA
2400      BNE ADD
2410      LDA STRING   ;SET STRING FLAG
2420      EOR #1
2430      AND #1
2440      STA STRING
2450      BNE ADD
2460 ;
2470 TEST3 TYA         ;IS TEXT "DATA"?
2480      PHA
2490      DEY
2500      DEY
2510      DEY
2520      DEY
2530      LDA BUFFER,Y
2540      CMP #':
2550      BEQ T3
2560      CMP #SPACE
2570      BNE ADD1
2580 T3   LDX #4
2590 T3A  INY
2600      LDA BUFFER,Y
2610      CMP TEXTD-1,X
2620      BNE ADD1
2630      DEX
2640      BNE T3A
2650      LDA STRING
2660      BNE ADD1
2670      LDA #1       ;SET DATA FLAG
2680      STA DATA
2690 ;
2700 ADD1 PLA          ;ADD BYTE TO
2710      TAY          ;CHECKSUM
2720 ADD  LDA #0
2730      STA TEMP2
2740      LDA BUFFER,Y ;GET BYTE
2750      STA TEMP1
2760      LDX SHIFT    ;SHIFT 1-8 BITS
2770      BEQ A3
2780 A1   ASL TEMP1
2790      ROL TEMP2
2800 A2   DEX
2810      BNE A1
2820 A3   LDA CHKI
2830      EOR TEMP2
2840      EOR TEMP1
2850      STA CHKI
2860      LDA CHK1
2870      CLC
2880      ADC TEMP1
2890      STA CHK1
2900      LDA CHK2
2910      ADC TEMP2
2920      STA CHK2
2930 ;
2940 NEXT INY
2950      DEC SHIFT
2960      BPL MORE1
2970      LDA #7
2980      STA SHIFT
2990 MORE1 JMP MORE
3000 ;
3010 TEXTR .BYTE "MER" ;REM
3020 TEXTD .BYTE "ATAD" ;DATA
3030 ;
3040 ;PRINT DIGITS FOR CODES 0-31
3050 ;
3060 ASCII .BYTE "0123456789ACDEF"
3070      .BYTE "GHJKLMNPQRSTUVWXY"
3080 ;
3090 INIT LDY #0       ;ADD G: TO TABLE
3100 LOOK LDA HATABS,Y
3110      BEQ FOUND
3120      CMP #'G
3130      BEQ SET_MEM ;ALREADY EXISTS
3140      INY
3150      INY
3160      INY
3170      CPY #33
3180      BNE LOOK
3190      JMP SET_MEM ;NO SPACE LEFT
3200 ;
3210 FOUND LDA #VECTAB&255 ;ADD ENTRY
3220      STA HATABS+1,Y
3230      LDA #VECTAB/256
3240      STA HATABS+2,Y
3250      LDA #'G
3260      STA HATABS,Y
3270 ;
3280 SET_MEM LDA #NEW_LOMEM&255
3290      STA $02E7   ;SET NEW LOMEM
3300      STA $0E
3310      STA 128
3320      LDA #NEW_LOMEM/256
3330      STA $02E8
3340      STA $0F
3350      STA 129
3360 ;
3370      LDX #9       ;ZERO WORK SPACE
3380      LDA #0
3390 IN3  STA CHKI,X
3400      DEX
3410      BPL IN3
3420      RTS
3430 ;
3440 BUFFER .DS 256  ;BUFFER SPACE
3450 NEW_LOMEM ;     END OF DRIVER
3460 ;
3470 MESS .BYTE $9B,"GET-IT-RIGHT-II -
Loaded OK",EOL,EOL,0
3480 ;
3490 SETUP LDA #$3C  ;STOP CASSETTE
3500      STA $D302
3510      LDY #0       ;PRINT "LOADED"
3520 R1   TYA
3530      PHA
3540      LDA MESS,Y
3550      BEQ R2
3560      JSR CHOUT
3570      PLA
3580      TAY
3590      INY
3600      BNE R1
3610 R2   PLA
3620 ;
3630      LDA #INIT&255 ;SET CASINI
3640      STA $02
3650      LDA #INIT/256
3660      STA $03
3670      INC 202      ;COLDSTART BASIC
3680 ;
3690      CLC          ;DO INIT
3700 FIN  RTS
3710      .END
```

Listing II: Disc modifications for Listing I

```
50 ;N.B. NON-RELOCATING DISC VERSION
0140      *=  $2200   ;AFTER DOS RAM
0160 ;
0180 ;
0190 ;AUTORUN.SYS FILE, SO NO NEED
0200 ;FOR BOOT SECTOR INFO.
0210 ;
3085 INIT
3086 OLD_DOSINI JSR 0 ;(DUMMY VALUE)
3090 IN1 LDY #0       ;ADD G: TO TABLE
3490 SETUP
3500 ;
3621      LDA $0C     ;STORE ORIGINAL
3622      STA OLD_DOSINI+1 ;VALUE FOR
3623      LDA $0D     ;DOSINI INTO OUR
3624      STA OLD_DOSINI+2 ;INIT CODE
3625 ;
3630      LDA #INIT&255 ;SET DOSINI
3640      STA $0C
3660      STA $0D
3680      JMP IN1
3690 FIN *=  $02E0
3700      .WORD RUN
```



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